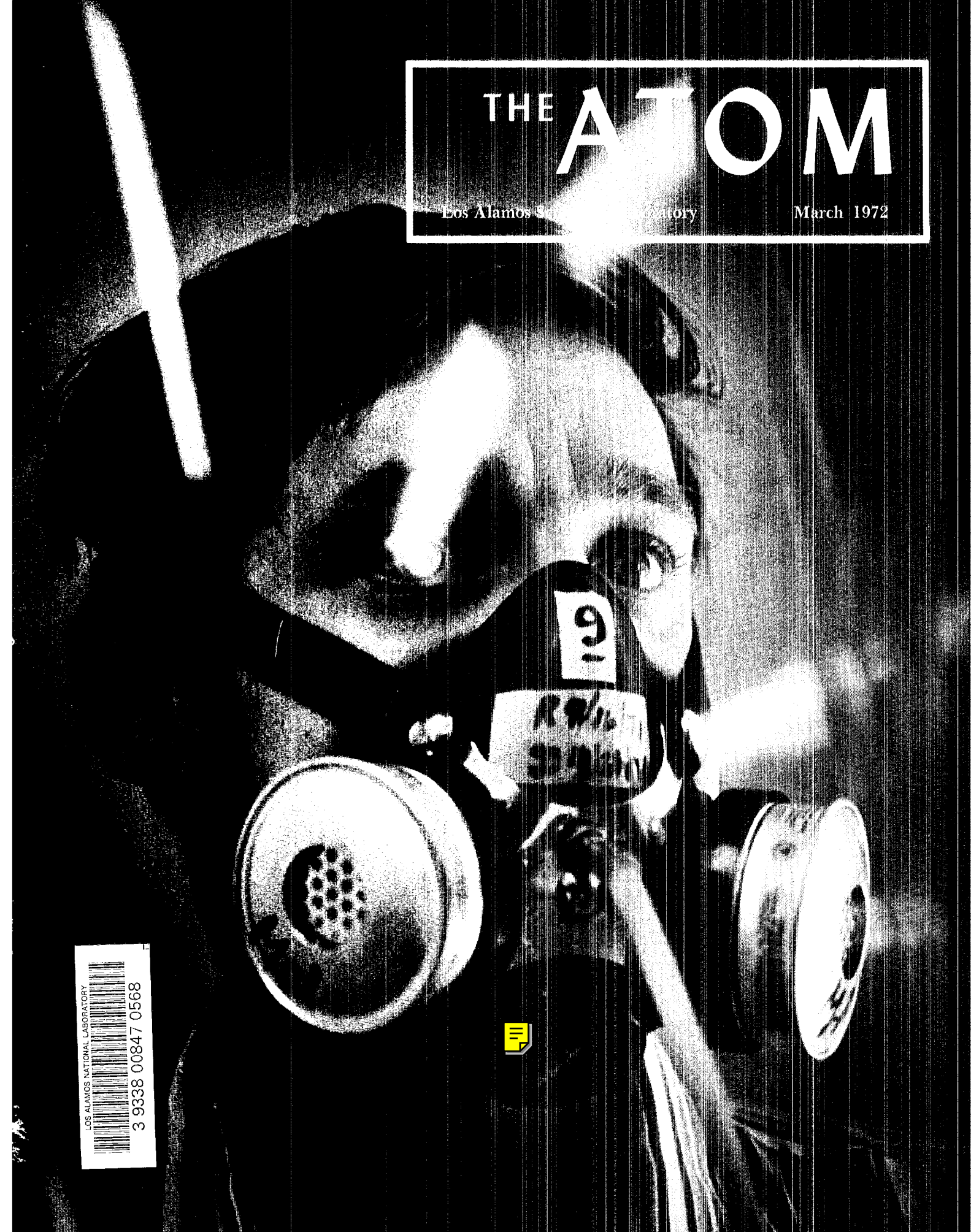
THE ATOM

Los Alamos Scientific Laboratory

March 1972



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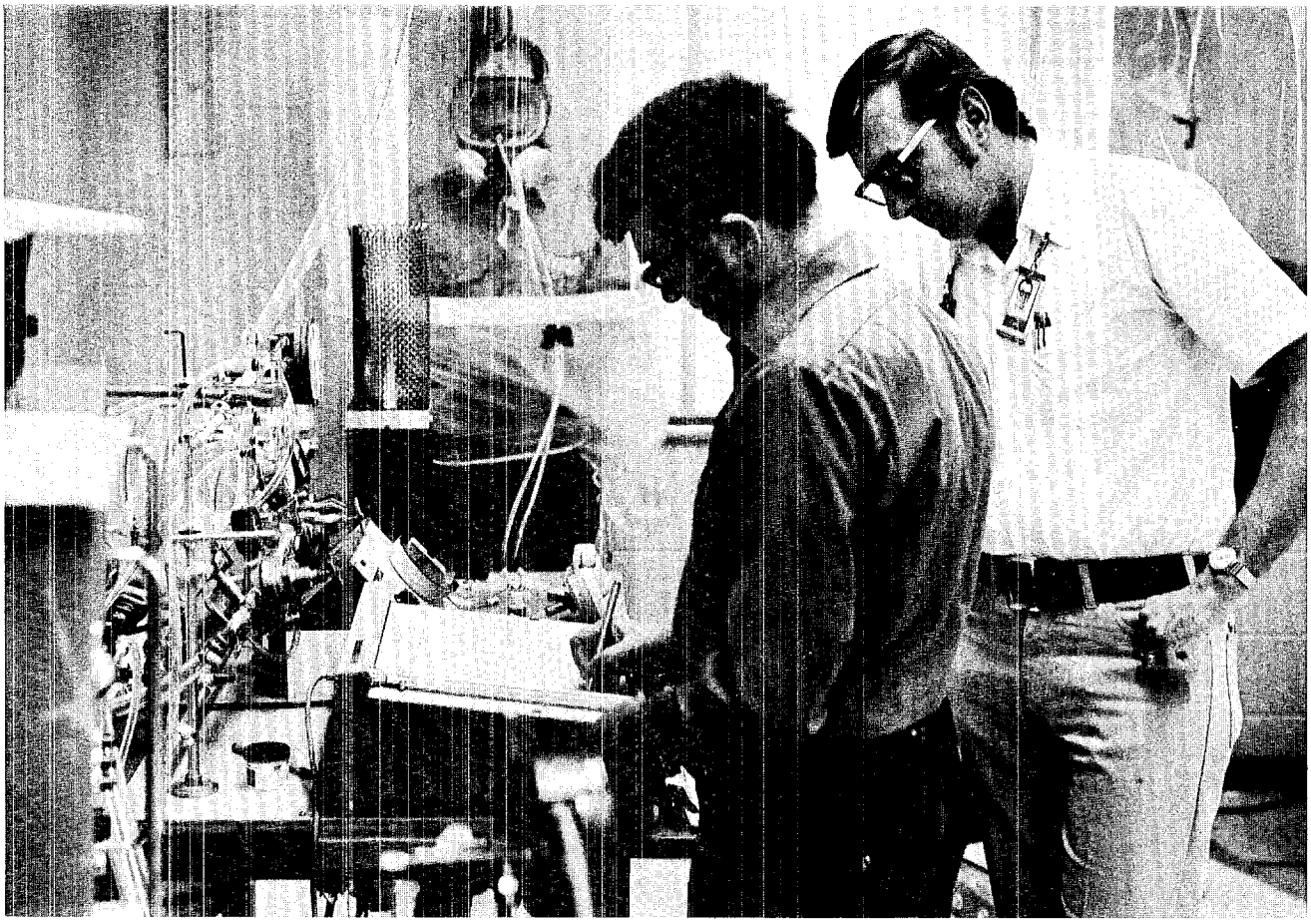
Los Alamos Scientific Laboratory, an equal opportunity employer, is operated by the University of California for the United States Atomic Energy Commission.

COVER:

The man on the cover is Richard Scarberry, SD-5, one of several employees at the Laboratory who is volunteering time to a study on how beards and sideburns affect the performance of air-purifying respirators. For more detailed information on the study, see the story beginning on page one.

Beards, Sideburns and Respirators

". . . a matter of objective prudence, not social criticism"



Graham Foster, T-2, tests a full-mask respirator in Group H-5's plastic test chamber. John Pritchard, right, watches as Louis Geoffrion marks breaks between exercises on the analyzing system's recording machine. Foster is volunteering time to help members of H-5 determine the effects of beards and sideburns on the performance of respirators.

Why did Alexander the Great order his Grecian soldiers to be clean shaven? The answer is that he felt whiskers were an occupational hazard.

Many men wore beards in Alexander's time, but the privilege was not extended to his soldiers because a beard was a good hand-hold in battle and thus an advantage to his enemies.

In a sense, history is repeating itself. In the last two to three years, whiskers have become increasingly popular, and as a result of preliminary tests conducted at the Los Alamos Scientific Laboratory there is an occupational hazard associated with them. This concerns men whose jobs are of a nature that they need the protection of air-purifying respirators.

Air-purifying respirators are used widely in industry, scientific research, the armed forces and in mining. The function of the respirator is to protect persons against the inhalation of noxious gases, vapors and aerosols, and its performance is largely dependent on the degree of a gas-tight seal between face and respirator mask.

Some employers, suspecting that this mask-face seal is interrupted by beards and sideburns, have ordered respirator wearers to be clean shaven. Although the orders have been given because of concern for the safety of their employees, some

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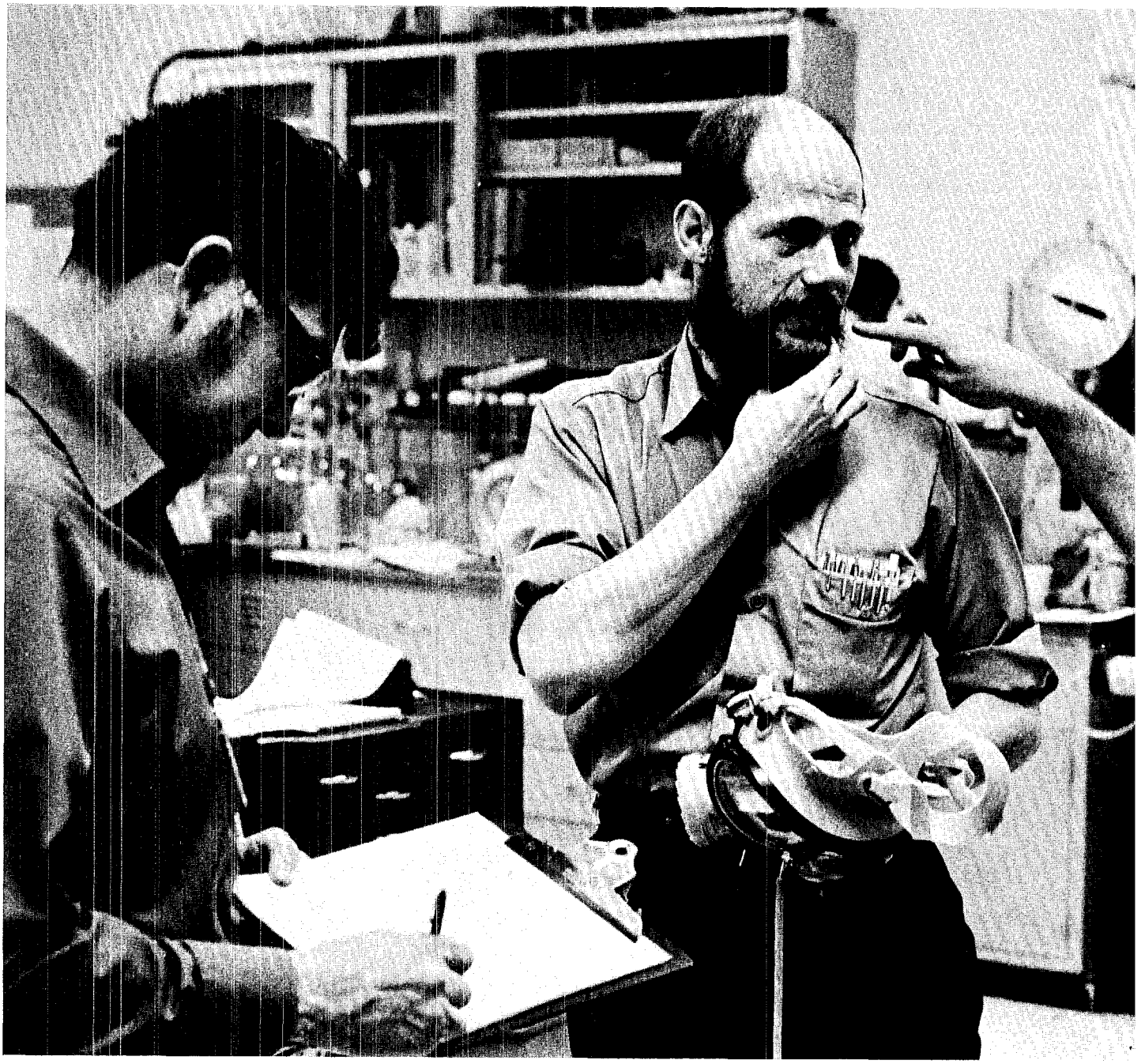
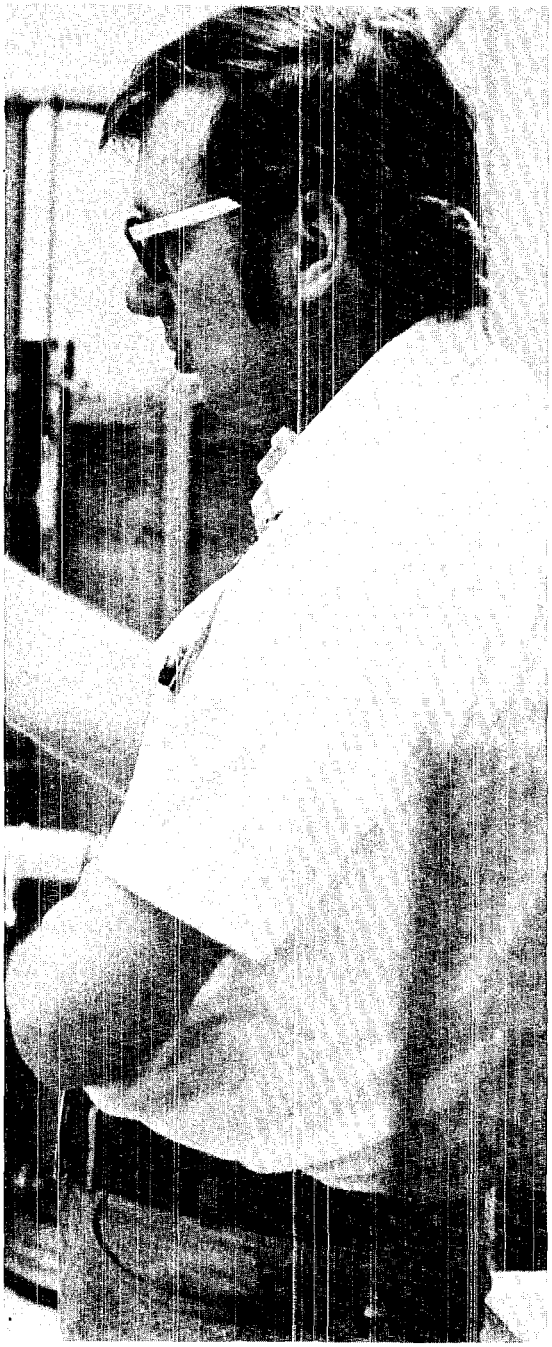


Foster discusses characteristics of a full-mask respirator with Geoffrion and Pritchard following a test. Foster was asked to rate the comfort of the mask and to indicate areas of possible leakage around the mask.

men have accepted the mandate as a violation of their rights and have taken their employers to court. To be suspect rather than to have the hard-and-fast proof that a hazard exists, is not the kind of evidence the courts like. As a result, some respirator wearers have retained their rights to be fashionably whiskered.

Because of such instances LASL industrial hygienists in Group H-5 have been deluged with requests for information concerning the effects of beards and sideburns on the performance of respiratory protection equipment. In response, they have issued an AEC progress report summarizing the preliminary results of respirator fitting tests which have been made on men who have beards or long sideburns or both.

In this report the scientists concluded:



Foster puts on one of the three full-mask respirators being used in the respirator experiment. In the foreground are other half- and full-mask respirators being used in the investigation.

"(1) Facial hair, if it interferes with the sealing area of a half-mask or full-mask respirator, does detrimentally affect the performance of the respirator.

"(2) The degree to which the performance of the respirator is affected is dependent upon: (a) the physical characteristics of the facial hair. (b) The length of the hair.

"It is our conclusion that unless some means is available to individually check the effect of the beard or sideburns on the performance of the particular respirator that the individual is wearing, then the wearing of beards and/or sideburns with respiratory protection equipment has to be considered hazardous to the individual."

The effects of beards on the performance of respirators is only one of several factors, or variables, being investigated by Group H-5 members Ed Hyatt, John Pritchard, Louis Geoffrion and Chuck Richards. Under funds provided by the Atomic Energy Commission's Director of Regulations and the National Institute for Occupational Safety and Health, the LASL industrial hygienists are in their third year of the most comprehensive study ever conducted of variables that affect the perform-

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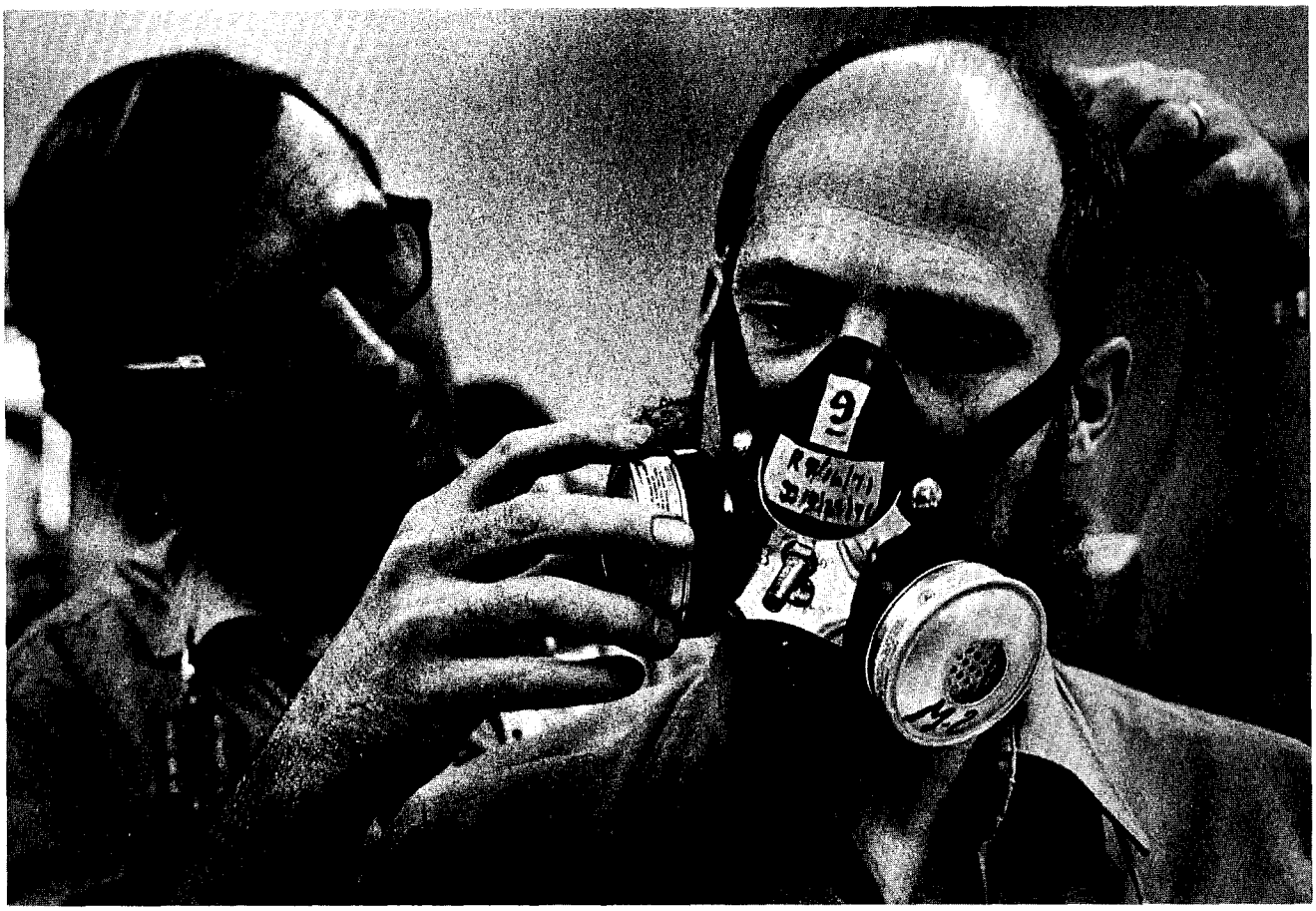


Pritchard helps Foster fit a half-mask respirator. Note the probe in the facepiece.

ance of respirators under simulated work conditions.

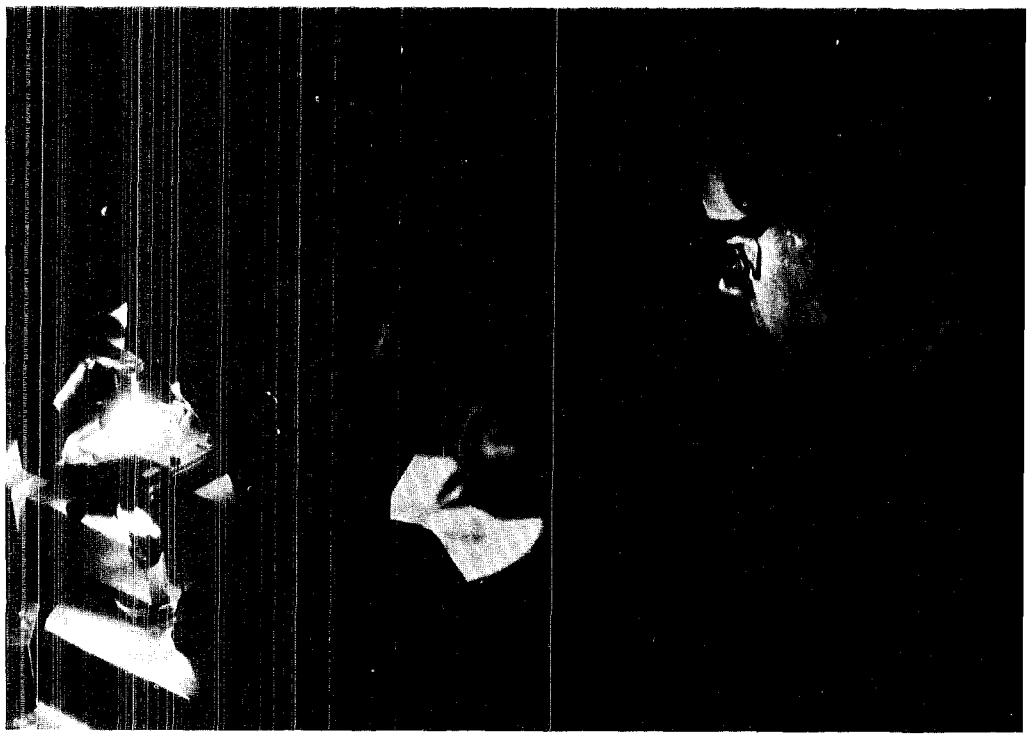
In the course of this study 50 respirator fitting tests had been conducted on men with beards and sideburns, or both, using a variety of half-mask and full-mask respirators. These were the tests on which the scientists based their preliminary report.

Since then, H-5 has been improving its statistical data with the help of many bearded and sideburned volunteers from the Laboratory.

Each of the volunteers is being tested with a total of six different respirators—three with full masks and three with half masks. The masks have been modified by inserting a probe through the facepiece at a point where it does not distort the facepiece fit. The probe enters the mask below the nose and near the mouth and is linked to an analyzing system which detects and accurately records the amount of leakage into the breathing zone.

A man undergoing the test is first properly fitted with a mask. He then enters a plastic test chamber. The chamber is flooded with a sodium-chloride (table salt) aerosol and the man performs a series of exercises while the probe carries air samples from inside his facemask to the analyzing system. The exercises consist of normal and deep breathing while sedentary, moving the head from side to side and up and down, smiling, frowning and reading aloud. This cycle is repeated by each man until he has been tested with all six respirators being used in the experiment.

"Other people have made qualitative tests on the effects of facial hair on the performance of respirators," Hyatt said, "but this is the most comprehensive quantitative study ever conducted on how it and other variables affect respirator performance under simulated work conditions. The reasons for the study are two-fold: One is to educate the worker so that he knows the importance of a properly fitted respirator, and the other is to improve the techniques and equipment that show whether a respirator fits or leaks. As far as hair is concerned, we're working on the problem as a matter of objective prudence, not of social criticism."



Don Petersen measures and counts chromosomes by projecting the microscopic image onto paper and tracing it.

Another Building Block For the Long Fight Against Cancer

The "major scientific breakthrough"—a term popular with many laymen—is a rare occurrence at a basic scientific research laboratory.

Actual scientific research is a process of building onto, and remodeling the ideas of, previous workers. The researcher utilizes all possible data, from technical journals to meetings to private correspondence. Occasionally, his own results are such that entirely unprecedented conclusions must be made.

A study currently underway at the Los Alamos Scientific Laboratory appears to be producing entirely new ideas on the nature of chromosomes and it is hoped the study will contribute additional ideas in man's fight against cancer.

As Paul Kraemer, H-4, said: "Our discovery that abnormal cells, such as cancer cells, have the same amount of DNA in each cell, despite having different numbers of chromosomes from cell to cell (within a particular tumor or cultured cell population) is very different from current dogma on such things.

"Furthermore, this finding has significant implications for tumor therapy and in the fundamental ideas of chromosome structure of both normal and abnormal cells."

DNA is deoxyribonucleic acid, which is the chemical substance of genes; the thousands of genes of each cell are located on chromosomes which become visible to the microscopist only during cell division.

The study by Kraemer, Don Petersen, Larry Deaven, Harry Crissman and Marvin Van Dilla, all H-4, is the first one in which the DNA content of very large numbers of individual cells has ever been measured. As a result of having extremely accurate measurements of the DNA in many thousands of individual cells of particular cell populations (such as cells from a tumor), Kraemer and his colleagues were able to consider alternative ideas that had never been seriously considered before.

How were they able to do this?

By a method known as Flow Microfluorometry (FMF).

This process, developed by Van Dilla and his co-workers in H-4's biophysics section, is in concept a fairly simple procedure utilizing fluorescent dyes that stain only the DNA of the cells. Cells are stained in an aqueous solution. They are allowed to flow in a thin stream across a narrow laser beam. Each cell crosses the beam individually, in only a few millionths of a second.

During this brief exposure, the laser light activates the fluorescent

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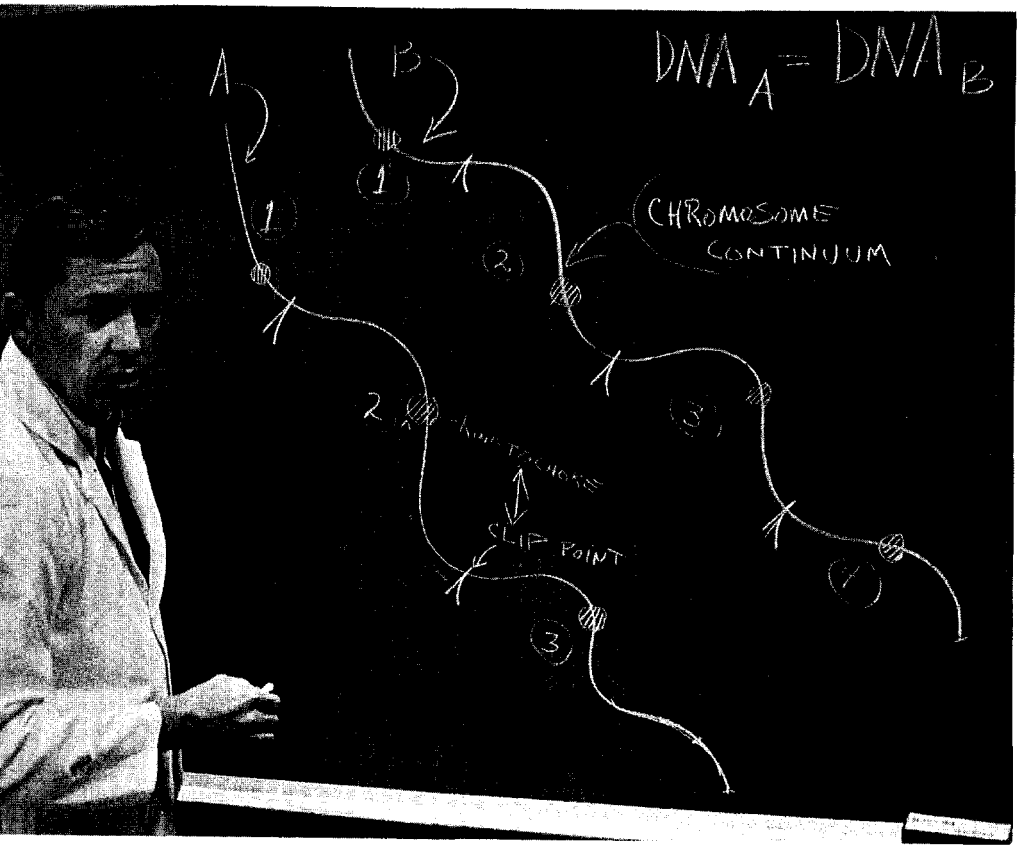
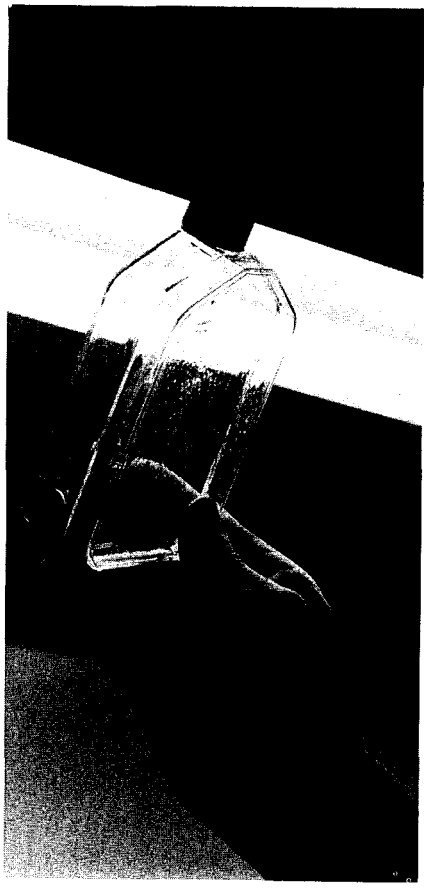
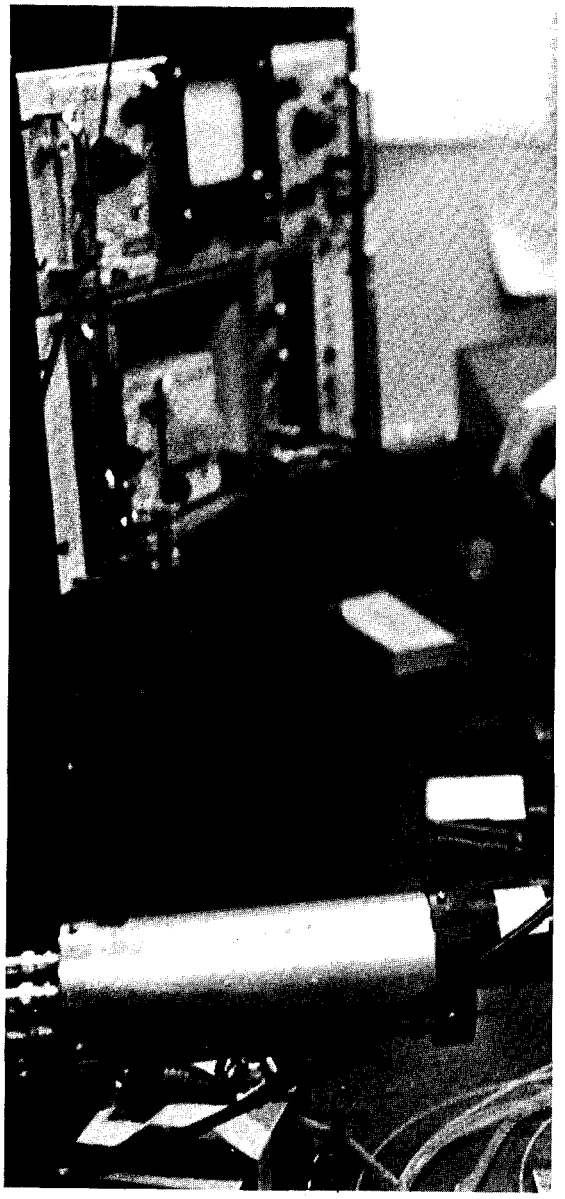


Paul Kraemer illustrates how the DNA content in two different cells is the same (represented by the length of the two wavy lines) but the number of chromosomes (represented by the different number of clip points) is different.



Cultured cells are grown in glass bottles at H-4. Each minute white dot on the inside walls of the bottle is a cell colony containing about 1,000 cells.

Harry Crissman (foreground) monitors a stream of cells flowing through the laser beam as Marvin Van Dilla adjusts the laser beam for the desired intensity.

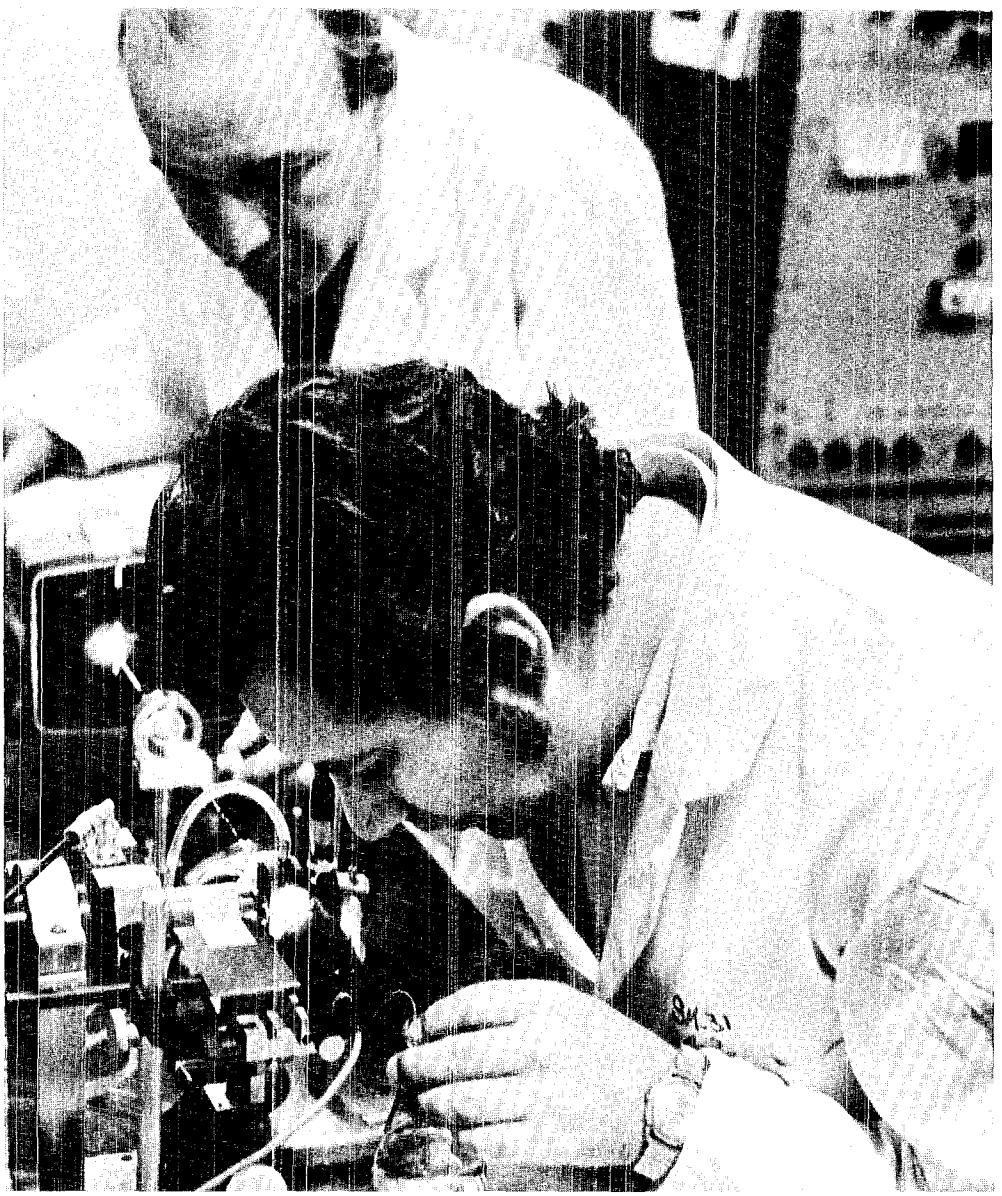


dye which in turn causes an equally brief flash of emitted fluorescent light. The intensity of the emitted light is a measure of the amount of fluorescent stain in the cell and hence a measure of the DNA content of that cell. By suitable optical and electronic apparatus, the individual light-flashes are measured and stored in a multichannel pulse-height analyzer at a rate of many thousand per minute.

"Many different populations of both normal cells and cancerous cells of a variety of species, including human were studied, in each case measuring the DNA content of individual cells as well as examining the chromosomes," Kraemer said.

The general result of this study was that the normal cells, after they had recently divided, all had the same amount of DNA both within the particular cell population studied, as well as between cell populations from various mammalian species. In addition, the normal cells showed hardly any cell-to-cell variability of their chromosomes.

The cancerous cell populations, by contrast, often had an abnormal amount of DNA in each cell and also showed great cell-to-cell variability of the chromosomes. The cancerous cells did not, however, have an abnormal cell-to-cell variability of DNA content.



To illustrate, if the DNA measurement of a recently divided normal human cell was, say 10, it was also 10 for all of the normal cells of the culture. In mitosis, all of these cells would have 46 chromosomes. By contrast, mitotic HeLa cells (from a human tumor) had chromosome numbers that varied, cell to cell, between 50 and 80. Yet the DNA content of the HeLa cells, although elevated to 15, showed the same cell-to-cell constancy as normal cells. This DNA constancy in the face of chromosome number variability is contrary to what has been postulated in the past.

"For many years it has been known that the chromosomes of malignant cells were variable in both number and structure from cell to cell," Kraemer said. "The most meticulous studies indicated that such cells were almost like snowflakes, that is, no two cells were alike. The dogma has been that this chromosomal diversity directly reflected genetic diversity.

"We believe that this dogma is false, and postulate instead that these abnormal cells may have chromosomal diversity from a common genome." The genome of a cell is the total genetic information encoded in the total DNA; it determines the limits of that cell's activities and abilities. For example, a cell from a cat can never function in the same way as a cell from a cold-blooded species such as a fish.

"Many scientific studies have shown that in normal cells, the same genes are located at the same positions on the same individual chromosomes in every cell. It has been believed that the diversity of chromosome number of abnormal cells was the consequence of errors in partitioning of the chromosomes during cell division. Such a mechanism would result in both diversity of genes as well as diversity of cellular DNA content. The failure to find any abnormal dispersion of DNA content forces us to doubt this accepted construction.

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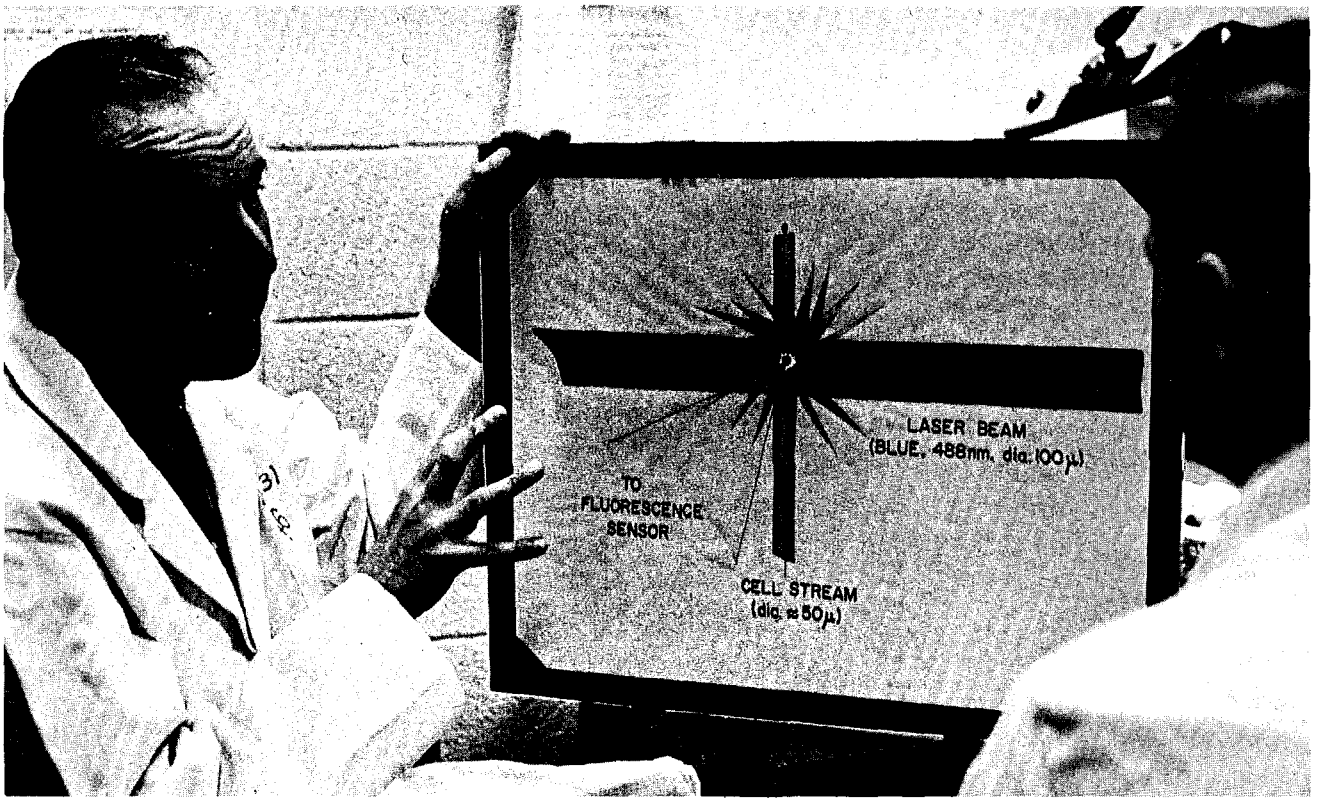

Van Dilla and Kraemer discuss the method whereby the cell stream flows through the laser beam where the DNA content is recorded.

"We believe that in both normal and abnormal cells, during the phase of the life of the cell when it is not in the process of cell division (the chromosomes are not individually discernible by any known method during this interphase period) the expanded chromosomes form a collective linear continuum by end-to-end fusion of the separate chromosome fibers. Preparations for cell division then include fission of this continuum into portions that will condense to form the familiar chromosomes of mitosis. In mitosis, the nucleus of the parent cell splits itself to produce two daughter nuclei, each of which carries the same number of chromosomes, or genetic material, as the parent cell.

"In normal cells" Kraemer said, "the points of fission are characteristic and invariant. Cancerous cells, by contrast, possess a defect in these mechanisms that divide the continuum into discrete pieces. Hence, a variable number of pieces are formed from a common continuum."

What does this mean?

The previous theories — which held that the chromosomal diversity of malignant cells directly reflected their genetic diversity— carried with them the pessimistic conclusion that no treatment would be likely to inhibit the growth of all of the genotypes represented in a tumor. Under Kraemer's theory, if the genetic diversity of tumors has been badly exaggerated, then attempts to kill all of the cells of a tumor so that no recurrance of the tumor occurs is not as hopeless as has been thought.

"Our idea is also of particular interest to understanding exactly what cancer is," Kraemer said, "since it focuses attention on a particular single mechanism that may be defective in all kinds of cancers, rather than emphasizing a purely descriptive phenomenon that is mechanistically completely mysterious."

Kraemer concluded that much more work and study will be required to discover how best to exploit these new and unorthodox findings in the search for control of cancer.

The Superconducting Transmission Line

A partial solution to some of our energy and environmental problems

The production of electrical power in the United States has doubled every decade since 1940. Even at this rate of increase, however, the balance between availability and demand is close, as evidenced by the "blackouts" and "brownouts" experienced in some of our highly populated areas.

Ironically the electric utility industry's efforts to meet electrical demands has created some environmental problems that the American public would like to see go away. One of these problems is the growing number of unsightly steel and wood towers whose transmission lines move large blocks of electrical power from generating plants to various consumer substations.

In an attempt to limit environmental sacrifices and still permit the necessary growth in the production of electrical power, President Nixon recently proposed a coordinated national energy program. One of the points of the Nixon program is to develop more efficient procedures and technologies for the transmission of electric power. To this end a group of scientists at the Los Alamos Scientific Laboratory is proposing a research and development project to demonstrate the technical and economic feasibility of transmitting large amounts of power long distances through an underground, direct-current, superconducting transmission line.

Such a line, the scientists say, would provide partial solutions to both our energy and environmental problems because it would eliminate al-

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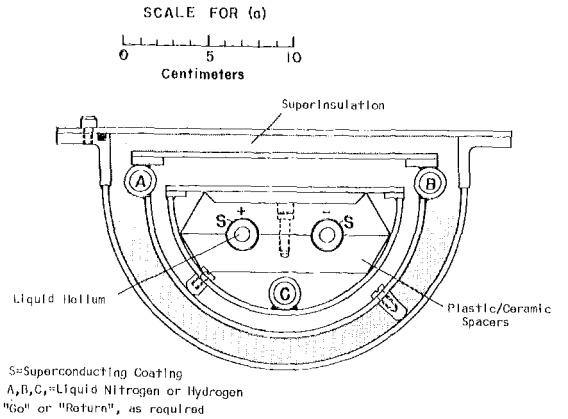
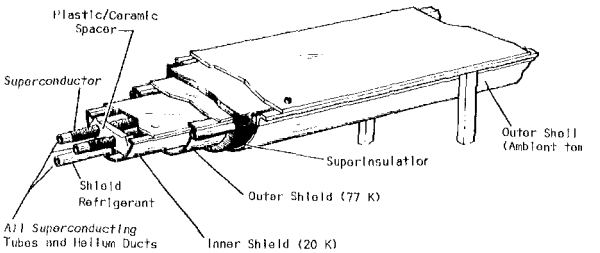
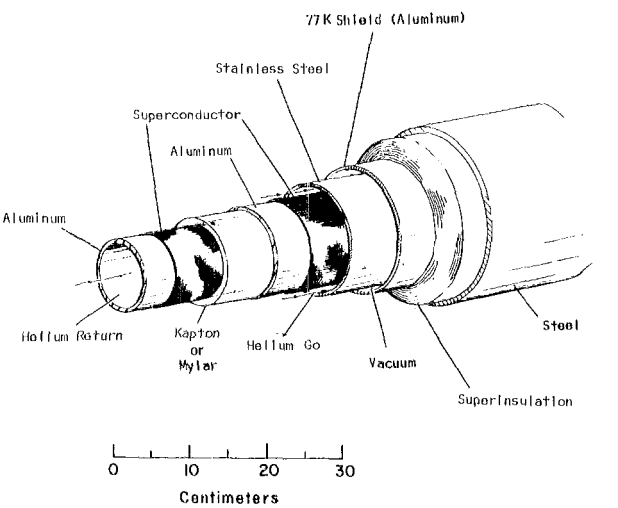




Artist's drawing is a conceptual design of the proposed test-bed transmission line which could be easily dismantled for modifications and studies of its components.

Conceptual design of the one-kilometer, coaxial superconducting transmission line is shown in this artist's drawing.



most all the transmission losses characteristic of conventional alternating current lines, and undergrounding would significantly reduce the so-called visual pollution of scenic areas by overhead transmission lines. These benefits would be derived from the combined advantages of superconductivity and direct-current transmission.

The proposed line would be expected to transmit to consumer sites better than 99.5 per cent of the power originating at a generating station. Conventional lines now transmit alternating current with an efficiency of 90-95 per cent. The remaining power is lost in transmission, and generating plants must be built with an excess capacity of from five to ten percent to compensate for this loss. Initially it may appear to be of little consequence. But, considering the total power produced in the United States, this is a lot of wasted electricity, fossil fuel, and excess generating plant capacity.

Most of these losses, due to the electrical resistance of the conductor, would be eliminated if a superconductor were used. Superconductivity is a phenomenon that has been observed in about half of the known metallic elements and more than 1,000 alloys. By cooling these materials to temperatures ranging from -255 to -273 degrees centigrade, their electrical resistance abruptly disappears.

Other losses associated with an alternating current transmission line stem in part from the line's inductance and capacitance. Unusable circulating currents flow back and forth in these elements all along the line thereby limiting the flow of real power to the customers. The ratio of the real power to the apparent power, is called the "power factor" of the circuit.

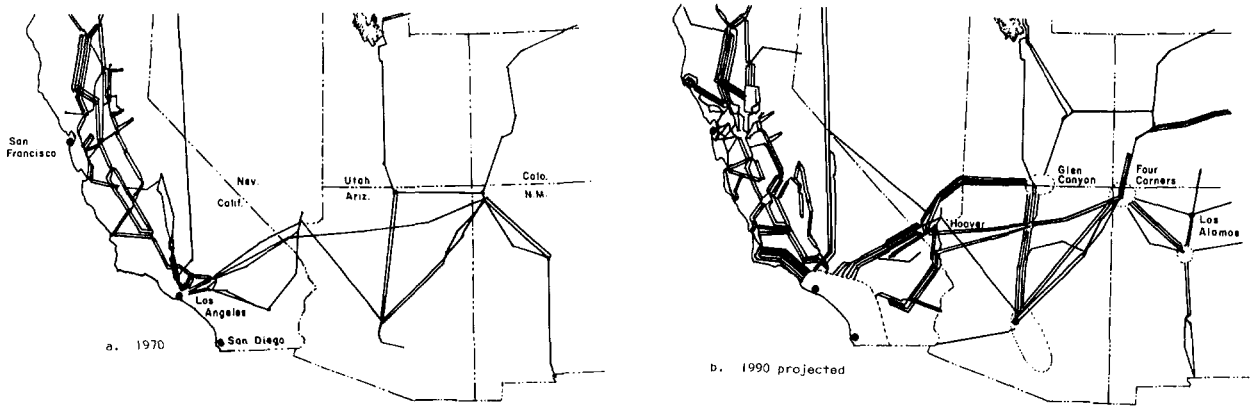
Since inductance and capacitance in the proper ratio tend to nullify each other, the circuit parameters are externally adjusted to minimize losses. The expense of dealing with power factor losses in this way accelerates drastically when an alternating current system is undergrounded, and this goes far in explaining the prevalence of overhead transmission lines. The cost of undergrounding is said to be five to 25 times greater than that of overhead cables. One reason for this has to do with line resistance. Resistance losses take the form of heat which in an overhead system is dissipated in the air. Heat dissipation in a high-power underground system requires that cables be force-cooled by oil, water, gas or cryogenic liquids.

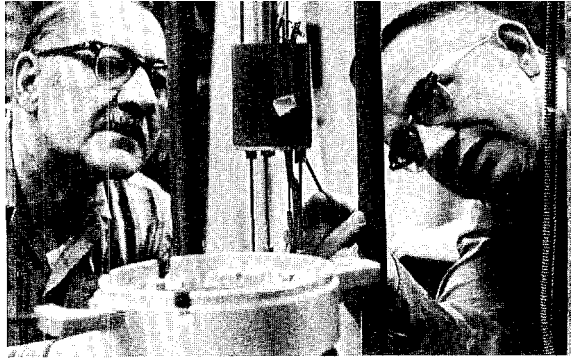
The proposed line would not require forced-cooling since the electrical resistance of a superconductor is precisely zero, although a small amount of power would be tapped from the line to refrigerate the superconductor.

The scientists noted several advantages of a direct-current, superconducting line. One of these is that since the power factor is irrelevant to direct-current lines, compensating equipment would not be necessary. Another is that a single superconducting line can carry as much power as a dozen or more conventional lines and requires a right-of-way of only 30 to 50 feet compared to 100 to 300 feet for each conventional overhead line.

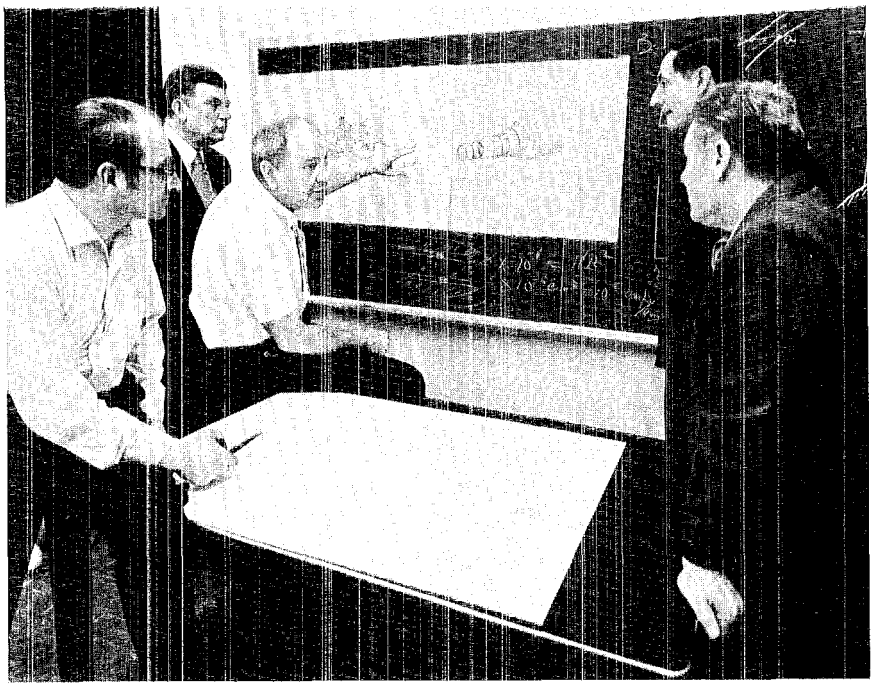
The cost-saving advantages of the superconducting line would be partially offset by other factors such as the price of excavating to underground the system, and the cost of equipment to convert the alternating current produced at the plant to direct current for transmission and vice versa at the consumer substation. Nonetheless, the

Drawing at left shows major transmission lines operating in the southwest as of 1970. Illustration at right includes additional lines projected through 1990.

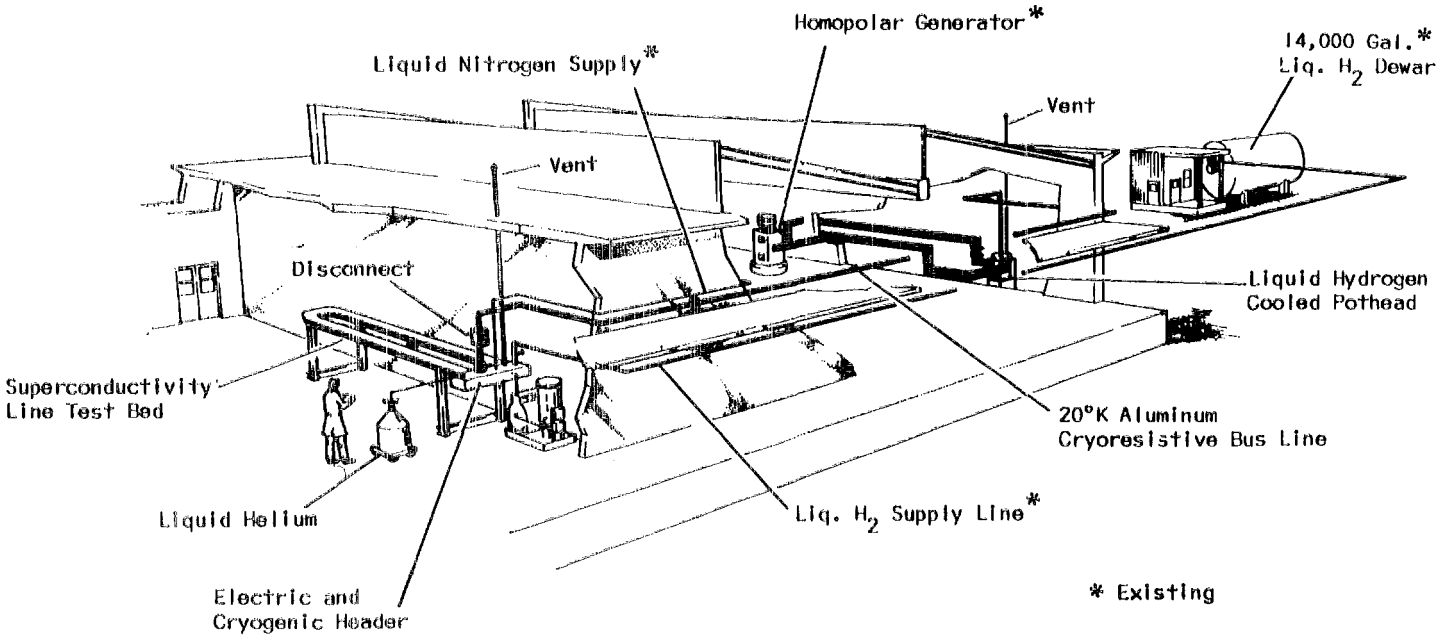




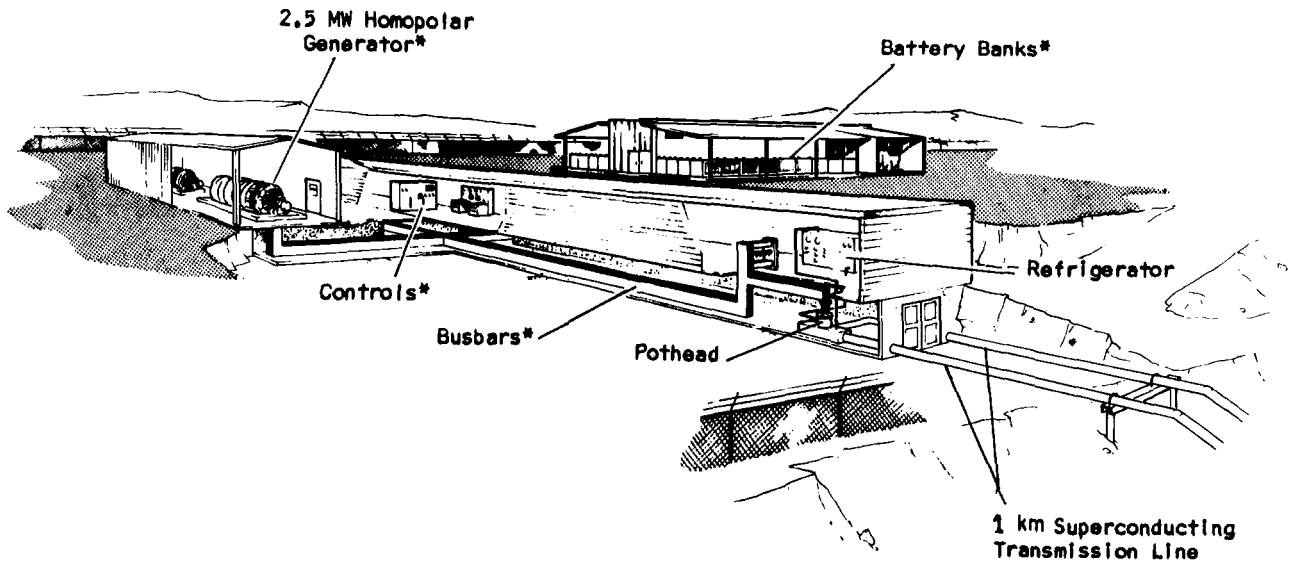
Above, Gene Kerr and R. Dean Taylor, both of P-8, insert a thin-film, niobium superconductor on a quartz rod into a cryostat. The superconductor is being tested to obtain fundamental engineering information on its current-carrying capacity in low magnetic fields. The technique for producing such thin-film conductors was developed by Larry Allen, CNC-4.



Ed Hammel (center), P-8, who would manage the proposed superconducting-line project, discusses possible techniques for joining sections of the one-kilometer line with Bill Keller, P-8 group leader; Bill Briscoe, acting E-division leader; Fred Edeskuty, associate P-8 group leader; and Mel Bowman, CMB-DO.



Artist's conception shows proposed location of major services for the phase one superconducting line project.



The conceptual installation of the one-kilometer line at TA-46 is shown in this illustration.

LASL scientists feel the proposed system would still represent both an economic and environmental gain. The expense of conversion equipment has decreased in recent years and this trend is expected to continue. In addition, some future plants will produce direct-current power, thereby reducing the amount of necessary conversion equipment by half.

The scientists noted that, according to the Atomic Energy Commission's Office of Science Technology, electric power generating stations will tend to concentrate at single large cities during the next 20 years. Since large plants tend to be more efficient than small ones, the researchers said, they are more economical to operate and less pollution per kilowatt hour will be produced. Because these sites would be located far from load centers, efficient high-power transmission lines will be required.

To demonstrate the technical and economic feasibility of the superconducting line, the scientists are proposing an eight- to ten-year, two-phase project under the management of Ed Hammel who would be assisted by Gene Kerr, R. Dean Taylor, Fred Edeskuty and Bill Keller, all of P-8, and Mel Bowman, CMB-DO, Bill Briscoe, acting E-division leader, and other senior staff personnel and technicians from P-, CMB- and E-divisions.

Phase one of the project would be conducted over a two to three year period and efforts would be directed toward the construction of a 20-meter test-bed transmission line. This line would be used to investigate electrical, operational and fabrication problems, various superconducting materials under transmission line operating conditions and other parameters necessary to construct a prototype.

Prototype construction and operation would make up the second phase of the project. At Technical Area 46, a one-kilometer, 5,000 megawatt line would be constructed based on the results of work done in the first phase. The scientists would investigate methods of fabricating cable sections, joining them and checking their electrical and cryogenic properties. The prototype would be built in the form of a loop extending from the rim of a nearby canyon to the canyon floor and back. Because of the zero resistivity of the line and its loop configuration, once a current is established in the line it will continue to flow indefinitely, making it possible to realistically study operating problems of much longer lines.

Serious consideration has been given to both alternating and direct-current superconducting power transmission lines since 1961. Some of the early and more pertinent work was carried out by R. L. Garwin of the IBM Watson Laboratory at Columbia University and J. Matisoo of the IBM Thomas J. Watson Research Center. A prototype, however, has never been built.

Service Pins Awarded

25 Years

Aeby, Jack, H-8
Alarid, Benjamin, SD-1
Argo, Harold, P-4
Bayhurst, Theodore, ENG-4
Beckett, Charles, E-DO
Bensen, Norman, CMB-8
Blackwell, Charles, H-1
Bond, Avery, N-DOT/NTS
Bowman, Melvin, CMB-DO
Bramble, James, W-1
Bridge, James, MP-6
Briesmeister, Arthur, CNC-4
Canfield, Charles, PER-DO
Carlson, Donald, CMB-7
Carman, Thomas, CMB-7
Carmichael, John, CMB-11
Caveglia, Louis, A-3
Champion, Glenn, A-3
Chavez, Pascual, H-1
Chronister, Temple, CMB-11
Clancy, Michael, GMX-2
Clark, Willard, SD-6
Crook, Robert, ISD-7
Dallege, Leo, GMX-7
Davis, Neil, W-1
Diaz, Manuel, N-2
Dimas, Presciliano, GMX-2
Ditto, James, GMX-3
Dunahugh, Kenneth, SD-5
Dunn, Montie, GMX-3
Ebelacker, Virginia, GMX-7
Ellinger, Finley, CMB-5
Faussone, Roscoe, CMB-6
Filip, Henry, N-1
Fitzgibbon, Francis, CMB-14
Fitzhugh, Robert, J-8
Florin, Alan, CNC-2
Freeborn, David, SD-5
Fresquez, Ramon, GMX-3
Fulgenzi, Lawrence, GMX-3
Gallagher, James, P-1
Galvin, Edward, SD-1
Gamble, Waldo, CMB-7
Garcia, Ernestine, H-1
Garcia, Manuel, SD-1
Gibson, William, CMB-11
Gilmore, James, CNC-11
Gilmore, Robert, CMB-11
Giorgi, Angelo, CMB-3
Glore, Paul, P-1
Gutierrez, Conrado, Dir. Off.
Harlow, James, P-8
Hartshorne, Pierre, CMB-6
Hauser, Frank, GMX-3
Henicksman, Arthur, CMB-1
Herrera, Joe, CMB-AP
Hilton, Elmer, GMX-3
Holm, Robert, P-14
Jarvis, George, N-2
Johnson, Ogden, H-4
Jones, Richard, SD-1
Kinker, John, GMX-3
Kircher, John, CMB-8
Krainock, Suzanne, CNC-4
Krikorian, Nerses, CMB-3
Krupka, Milton, CMB-3
Lamb, John, P-1
Lane, William, C-1
Lang, Harold, P-9
Leary, Joseph, CMB-DO
Lew, Marion, CMB-1
Littlejohn, George, H-1
Lopez, Jose, H-1
McDonald, William, GMX-7
McGurn, Theo, AO-1
McNeese, Wilbur, CMB-11
MacMann, Edward, W-7
Maestas, Jacobo, CMB-AP
Manker, Dean, A-3
Mark, Carson, T-DO
Marshall, Elizabeth, GMX-4
Martinez, Alfredo, SD-DO
Martinez, Benito, H-1
Martinez, Johnnie, GMX-4
Martinez, Ramon, CMB-6
Mascarenas, Antonia, ISD-4
Mench, John, ENG-2
Meyer, Dean, H-1
Money, Richard, CMB-3
Montoya, Antonio, H-1
Morgan, Arthur, Jr., CMB-11
Mullins Lawrence, CMB-11
Nagy, Bernice, PER-7
Nilsson, Clifford, SD-2
Nordeen, Clifford, CMB-11
Norman, Lester, GMX-3
Northrup, Thelma, AO-2
Norwood, William, GMX-3
Oliver, Charles, SD-5
O'Mara, Edward, SP-3
Orndoff, John, N-2
Ortiz, Ursulo, SP-4
Osborn, James, GMX-4
Pacheco, Epimenio, GMX-3
Padilla, Lena, GMX-7
Pfaff, Dan, ENG-2
Pierce, Robert, GMX-3
Popolato, Alphonse, GMX-3
Porter, Phil, J-8
Potter, Robert, CNC-4
Povelites, John, CNC-4
Rasmussen, Roger, GMX-4
Reynolds, Charles, ENG-4
Rhodes, William, CMB-11
Rickerson, Luther, SD-4
Robbins, William, CMB-8
Roensch, Arno, SD-3
Romero, Albert, SD-1
Romero, William, H-1
Russell, John, GMX-7
Sanborn, Walter, SP-12
Sandoval, Fred, CMB-7
Sattizahn, James, CNC-11
Scargall, Jennie, GMX-7
Schell, Donald, CMB-6
Schultz, James, SD-5

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Schwartz, Mortimer, GMX-3
Segura, Nepomuceno, SP-2
Serna, Santiago, CMB-11
Shaffer, David, CMB-14
Sheinberg, Haskell, CMB-6
Smith, Robert, CMB-8
Snowden, Harry, P-16
Sojka, Zygmund, SD-DO
Spaulding, Robert, GMX-7
Squires, Raymond, SD-DO
Stack, Francis, SD-DO
Stahl, John, SD-2
Stone, Roy, GMX-6
Suazo, Jose, CMB-AP
Swickard, Earl, N-5
Tafoya, Alfred, ENG-5
Tafoya, Jose, H-2
Unger, Walter, W-7
Valdez, Isaac, P-8
Van Buskirk, Marvin, SD-1
Van Lyssel, Billie, P-1
Van Lyssel, Robert, GMX-4
Van Vessem, Alvin, GMX-7
Varoz, Jose, H-1
Weintraub, Larry, C-DO
Weiss, Eugene, AO-1
West, William, SP-10
Whyte, Neil, ENG-2
Wilhelm, Richard, MP-DO
Wilson, Walter, CMB-1
Winston, John, P-1
Witteman, Willard, CMB-3

20 Years

Aldrich, Tyler, Dir. Off.
Alei, Mohammed, CNC-2
Anderson, Gordon, SD-6
Anderson, James, GMX-7
Anderson, Mazie, H-2
Anderson, William, C-5
Apodaca, Joe, SP-3
Armstrong, Dale, CNC-4
Baggett, Lester, GMX-4
Bailey, John, SD-5
Baldwin, Seth, SP-2
Balestrini, Silvio, CNC-11
Bame, Samuel, P-4
Bannerman, Daniel, J-8
Bard, Richard, CMB-8
Barnes, Robert, GMX-3
Barrington, Gene, SD-5
Beaumont, Arthur, CMB-11
Bechtol, Hazel, W-1
Bergamo, Emily, AO-6
Bergamo, Louis, CMB-5
Bergauer, Simon, SD-5
Billings, Bernard, SD-1
Blatti, Claude, SD-5
Blatz, Laurence, CNC-2
Boyer, John, SD-5
Bradford, Donald, C-7
Brandt, Daniel, SD-1
Brasfield, William, GMX-3
Brasier, Robert, ENG-7
Bridges, Lee, SD-4
Brown, Jack, W-10
Browne, Philip, TD-5
Burkhardt, Louis, P-14
Busse, Eugene, SD-5
Bustamante, Santiago, CMB-7
Bustos, Eloy, SP-2
Byers, Cleo, N-2
Calvin, Ross, GMX-3
Canada, Robert, TD-DO
Case, James, ENG-4
Casey, Roy, SD-1
Cashwell, Edmond, TD-6
Chambers, William, A-2
Chelius Leo, Sr., H-1
Claybrook, Billy, ISD-7
Clinton, Donald, SD-5
Cooper, Ethel, A-DO
Cotter, Theodore, N-DOT
Coulter, James, SD-5
Cox, Summers, H-4
Crisler, Tommy, CMB-6
Crowe, Warren, Dir. Off.
Cunningham, William, SD-5
Desilets, James, ENG-2
Dion, Joseph, ENG-4
Doddridge, Robert, SD-1
Dow, Grove, CMB-7
DuBois, Frederick, GMX-3
Dunwoody, Wade, MP-7
Edeskuty, Frederick, P-8
Edwards, Claude, SD-5
Elliott, Reed, CMB-5
Elliott, Robert, H-1
Engle, Leon, N-2
Eutsler, Bernard, H-5
Farrar, Ernestine, H-2
Felthauser, Harry, P-4
Ficht, Harry, P-8
Fickett, Wildon, T-4
Fojtik, Anna, H-DO
Freidline, Lucille, AO-DO
Fretwell, James, P-8
Gardner, Ross, CMB-1
Gauler, Raymond, GMX-3
George, Irwin, SD-1
Gettemy, Willard, SD-5
Gilbert, Martin, SD-5
Ginder, Robert, SD-5
Goad, Walter, T-DOT
Gomez, Loyola, SP-4
Gotti, Richard, AO-3
Grauerholz, Glenn, GMX-3
Gray, Gordon, SD-5
Groff, Clifford, SD-1
Hammel, Jay, P-17
Harmer, Clarence, SD-5
Heath, William, GMX-3
Henry, Earl, SD-1
Herin, Walter, N-3
Hoffman, Gordon, N-1
Holmberg, Raymond, SD-5
Horpedahl, Leroy, W-9
Hudgins, James, ISD-7
Jackson, Frank, GMX-11
Johnson, Karl, CMB-11
Johnston, Richard, GMX-7
Jones, Llewellyn, CNC-4
Jones, Reginald, SD-5
Jones, Thomas, CMB-6
Kazek, Chester, Jr., C-3
Keenan, Thomas, CMB-11
Keller, William, P-8
Kelley, Donald, CMB-11
Kimble, Ernest, GMX-3
Konrad, John, ENG-4
Land, Thomas, AO-3
Lane, Don, ENG-2
Larson, Robert, SD-1
Lawrence, James, H-1
Lazarus, Roger, C-DO
Lindblom, Norman, ISD-7
Lucero, Alfonso, SP-3
Lujan, Virginia, ISD-4
McCartney, Margaret, GMX-7
McCloskey, Maurice, SD-5
McDonald, Raymond, ENG-2
Marrs, Jean, C-1
Marsh, James, SD-5
Martinez, Carlos, GMX-3
Martinez, Celedonio, H-1
Martinez, Fermin, H-1
Martinez, Gilbert, GMX-4
Martinez, Mary, ISD-5
Matheson, John, ENG-4
Meadows, Relbert, GMX-6
Means, John, SD-5
Medina, Camilo, P-15
Miller, Paul, GMX-3
Miner, William, CMB-5
Montoya, Benito, SD-1
Moss, Shirley, AO-1
Moyer, Willard, CMB-7
Myers, James, GMX-3
Mynaugh, Adela, CMB-11
Nance, Robert, CMB-11
Nereson, Arnold, SP-11
Nims, Maxine, CMB-14
Nyquist, Kenneth, SD-5
Olsen, Eugene, SP-3
Ortega, Leo, AO-6
Penland, Robert, H-3
Peters, Vosbert, SD-5
Peterson, Carl, CMB-11
Phelps, Robert, CMB-1
Pickett, Robert, SD-5
Rector, Marion, SD-5
Rendon, Lourdes, H-1
Riggs, Edward, SD-DO
Robbins, Bruce, CMB-11

Romero, Leopoldo, GMX-3
Roybal, Daniel, CMB-6
Ruminer, Coleson, SD-5
Ryan, Bernard, MP-5
Salaz, Pres, ISD-7
Salazar, Arsenio, SP-8
Sandoval, Miguel, AO-5
Sawyer, George, P-15
Schlatterer, Louis, SD-3
Schlosser, John, GMX-1
Schmidt, LeRoy, SD-5
Schmitt, Richard, SD-5
Schoolcraft, Albert, SP-3
Seagrave, John, P-DOR
Siverly, Pauline, GMX-3
Stein, Patricia, H-5
Stenholtz, Roy, SD-5
Sterkel, Fred, SD-5
Sundberg, Delbert, ISD-DO
Susco, Dante, TD-4
Sweet, Sherman, AO-DO
Tate, Raymond, CMB-5
Terrell, James, P-DOR
Theobald, Karl, J-10
Tilby, Albert, SD-4
Trujillo, Joe, CMB-14
Trujillo, Lee, SP-4
Tuck, James, P-DO
Valdez, Bartolo, CMB-11
Wagner, Robert, N-2
Walker, Harvey, GMX-3
Wallis, Malcolm, P-9
Waugh, Harry, W-1
Weber, Wilfrid, H-DO
Whitehead, George, N-1
Williams, Arthur, P-7
Williams, Benjamin, ENG-3
Wilson, Donald, SD-5
Wynne, William, SD-5
Young, James, GMX-7
Zastrow, John, MP-2
Zellman, Mary, SD-DO
Zerwekh, Al, CMB-1

15 Years

Allen, Jerry, J-14
Arellano, Gerson, GMX-3
Bacon, Edgar, Dir. Off.
Bailey, Arthur, P-16
Baldridge, Loretta, W-1
Balog, George, CMB-3
Barfield, Walter, T-4
Barlich, Albert, TD-4
Beiler, Robert, J-3/NTS
Bender, John, CMB-11
Bennett, Elbert, J-14
Black, Lucien, J-16
Blais, Normand, CNC-4
Bramlett, Walter, ISD-5
Brinkley, Forrest, T-1
Brower, Sidney, GMX-4
Brownlee, Robert, J-9
Caird, Robert, GMX-6
Carmichael, Byron, T-1
Carroll, Fremont, ENG-2
Carroll, Thomas, SD-2
Carter, Glenn, G-2
Chandler, Thomas, GMX-3
Chaney, Melvin, W-3
Christenson, Conard, H-7
Clark, Georgia, P-1
Coleman, John, SD-4
Collier, Concha, CMB-1
Connellee, Rodger, ENG-1
Croley, Dale, CMB-1
Crouse, Roberta, SP-12
Cutler, Louis, MP-5
Daily, Dorothy, ISD-7
Daly, Richard, GMX-3
Deinken, Herman, W-9
Deverall, John, N-5
Duran, Bennie, SP-2
Durham, Franklin, N-DO
Edgett, Ivan, GMX-3
Ehart, Phillip, CMB-6
Ehrenkranz, Theodore, H-3
Elliott, Guy, CNC-2
Ferdinand, Edward, SD-2
Fisher, Billy, N-1
Foglesong, Mildred, N-DO
Fowler, Clarence, GMX-6
Fowler, Eric, H-7
Franke, Paul, MP-6
Fuentes, Gilbert, CMB-AP
Gallegos, Johnnie, J-14
Garcia, Ramon, GMX-3
Gardella, Robert, ENG-6
Givens, Arlin, J-3/NTS
Gonzales, Ramona, AO-4
Gore, Raymond, MP-1
Gould, Walter, J-10
Green, Walter, CMB-13
Grisham, Genevieve, CNC-11
Hall, Donald, ENG-2
Hall, Vinson, ENG-4
Harrington, Betty, W-3
Hasenbank, Alvin, ENG-2
Heath, Virginia, CMB-5
Heimbach, David, ISD-5
Helmick, Herbert, N-2
Herrera, Gilbert, SP-3
Herrick, Claude, CMB-13
Holt, Joseph, TD-2
Horton, Glen, ENG-2
Ingwerson, Darrell, GMX-7
Jackson, Darryl, CMB-1
Jacobson, Jack, T-4
Janney, Donald, GMX-11
Johnson, Carl, J-1
Johnson, Jack, W-10
Juveland, Allan, W-3
Kemme, Joseph, N-5
Kernodle, Norman, GMX-3
King, Jane, TD-5
Kmetko, Edward, T-4
Koelle, Alfred, P-1
Kohl, Donald, MP-4
Krenzien, Lawrence, J-8/NTS
Larson, Thomas, GMX-2
Linder, Charles, ENG-6
Lindsey, Jean, H-5
Linke, Marvin, ENG-2
Lizut, William, GMX-3
Loewenstein, Shirley, AO-4
London, Ronald, GMX-1
Lopez, Reymundo, ENG-2
Lory, Robert, CMB-7
Luders, Robert, P-9
Lyon, Virginia, PER-4
Maltrud, Richard, W-7
Manger, Charles, MP-3
Manthei, Allen, W-7
Martinez, Benny, SD-DO
Martinez, Eleanor, ISD-7
Marx, Edna, H-1
Maxwell, Calvin, GMX-3
Medina, Antonio, H-1
Mikkelson, Carl, GMX-3
Montoya, Frank, H-8
Morrison, Bruce, N-7
Morton, William, GMX-8
Mottaz, Glenn, CMB-1
Motz, Henry, P-DO
Moxley, Wilma, PER-5
Murry, Ruby, AO-DO
Newcom, Frank, SD-2
O'Keefe, Matthew, ISD-7
Olson, William, CMB-5
Ortega, Enriques, ISD-7
Orth, Charles, CNC-11
Ortiz, Gilbert, ISD-5
Patrick, Alton, N-5
Patterson, Gayle, H-1
Pederson, Jewell, GMX-7
Peterson, Donald, H-4
Phillips, Clara, H-5
Porto, Anthony, GMX-3
Porton, Robert, ISD-2
Prewitt, Robert, W-1
Rayburn, Harold, SD-DO
Regenie, Thomas, ENG-6
Reisfeld, Martin, CNC-4
Renfro, Richard, N-7
Richard, Jack, H-1
Richardson, Robert, ENG-2
Richerson, Nathaniel, CMB-6
Robertson, Richard, N-1
Robison, Arthur, GMX-3
Rose, Donald, N-1
Rottmayer, Doyle, SD-2
Roybal, Benigno, SD-2
Salazar, Freddie, C-8
Sanders, Bessie, SP-6

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Sanders, Clark, SP-4
Sanders, Horace, GMX-4
Sandoval, Robert, H-1
Sandoval, Secundino, J-9
Schiller, LeRoy, ENG-2
Schott, Garry, GMX-7
Scolman, Theodore, J-DO
Sibbitt, Wilmer, N-7
Simes, Betty, T-DO
Singer, Sidney, P-4
Smith, William, P-17
Stein, Myron, C-7
Stone, Sidney, J-10
Tafoya, Jose, GMX-3
Tatom, Jerry, J-6
Thorn, Linas, MP-6
Trexler, Vernon, J-14
Trujillo, Eliza, H-8
Trujillo, Jacobo, GMX-4
Turner, Almera, ISD-6
Ulibarri, Jose, ISD-7
Verre, Jeanette, H-DO
Wackerle, Jerry, GMX-7
Wagner, Paul, N-7
Waldschmidt, Leo, CMB-14
Waldschmidt, Robert, SD-4
Ward, Eva, GMX-3
Warren, John, J-16
Whalen, Paul, TD-1
Wilson, Mahlon, MP-6
Woolsey, Joseph, A-1
Wooten, John, Jr., C-7
Yost, Herbert, W-1

10 years

Arzola, Frank, ENG-3
Auchampaugh, George, P-3
Baca, Charlie, SD-1
Barnes, Robert, SD-5
Bateman, Alfred, J-7
Bevis, Darell, H-5
Bieri, Michael, A-2
Bieri, Mary, H-7
Blair, Allen, P-DOR
Blewett, Patrick, TD-5
Bohl, Richard, N-4
Booth, Mary, SD-2
Brooks, George, GMX-1
Brooks, Mary, H-4
Bryan, Gillette, CMB-1
Bryant, Lawrence, GMX-1
Burke, Clement, GMX-11
Butler, Thomas, T-3
Caldwell, John, A-2
Carnes, Cecil, W-9
Carpenter, Marvin, C-2
Clark, Edward, CMB-1
Clifton, David, CMB-11
Cooper, Ralph, TD-1
Cruz, Ralph, ISD-5
Davis, Cecil, J-15
Davis, Robert, ISD-3
Dean, Phillip, H-4
DeField, James, H-5
DeLay, George, SD-1
Dirk, Robert, W-1
Dudziak, Edwin, W-9
Dunn, Eleanor, MP-DO
Eddleman, Troy, TD-4
Ekberg, Ethen, CMB-14
Emelity, Ludgard, H-7
Ettinger, Harry, H-5
Evans, Doyle, P-4
Farnsworth, Fredie, GMX-3
Ferguson, Victor, SD-1
Frame, Jean, W-7
Frank, Robert, C-4
Frentzel, Mildred, PER-4
Fulton, Robert, MP-7
Gaetjens, Paul, Dir. Off.
Gardner, Samuel, GMX-7
Gilley, Corbin, CMB-11
Gladfelter, Ralph, SD-6
Green, Jere, CMB-11
Griffin, James, ENG-1
Hankins, Dale, H-1
Hanners, John, H-4
Hanson, Donald, N-3
Harvey, Bradford, GMX-3
Henderson, Michael, TD-3
Henry, Carl, A-2
Heyman, William, CMB-11
Holland, Redus, J-10
Holmes, Vanner, H-1
Huber, Marilyn, ENG-2
Humphreys, Kenneth, GMX-8
Hyer, Ronald, J-10
Jolly, Edward, GMX-7
Kelley, Teresa, CNC-11
Kennedy, Julia, H-1
Kirk, William, N-DO
Klaer, Margaret, H-2
Kostacopoulos, John, CMB-6
Lautenschlager, Melvin, SD-5
Lobb, Betty, SP-DO
Locke, Donald, GMX-7
Loggains, Christopher, ENG-2
Lucas, John, W-9
McCormick, Robert, GMX-7
McDowell, Robin, CNC-4
McInteer, Carlotta, MP-6
Maestas, Jose, SP-3
Maestas, Sixto, H-1
Maier, Otto, SD-1
Malenfant, Richard, N-2
Mann, Lawry, P-18
Marien, Donald, SD-1
Martinez, Mable, SP-10
Martinez, Rudolfo, CMB-11
Mathews, Robert, GMX-3
Meyer, Kenneth, TD-5
Minor, Robb, CMB-7
Morris, Roger, GMX-1
Morris, William, ENG-2
Munno, Edward, SD-1
Neergaard, James, C-7
Netuschil, Jennie, C-1
Niebuhr, David, J-6/NTS
Olcott, Alan, J-1
Olivas, Jerry, GMX-6
Ortiz, John, H-5
Otway, Harry, J-DO
Paine, Irene, C-1
Partridge, Ray, ENG-DO
Pepin, Robert, SD-1
Perkins, Roger, P-DO
Peterson, Donald, N-2
Petrie, Robert, GMX-3
Phelps, Leah, J-8
Pierce, Richard, H-1
Plassmann, Elizabeth, W-7
Pollat, LaVerne, SD-2
Pritchard, John, H-5
Quintana, Johnny, CMB-1
Rael, Robert, ISD-5
Randolph, Donald, ISD-5
Rector, Marjorie, Dir. Off.
Rivera, Rosella, WSD
Rivera, Xavier, W-1
Rodgers, William, WSD
Rodriguez, Gilbert, ISD-5
Rodriguez, Joe, MP-4
Ross, Earl, ENG-2
Roybal, Dolores, GMX-4
Salazar, Tony, H-1
Sandoval, Abad, C-1
Sandstrom, Donald, CMB-6
Seegmiller, Emma, GMX-7
Shepherd, George, H-4
Shupe, Melvin, CMB-11
Smith, Dorothy, P-4
Stanlick, Thomas, GMX-3
Stevens, Ralph, MP-4
Steyert, William ,P-8
Stroik, Paul, MP-3
Strong, Ian, P-4
Taylor, Louise, GMX-4
Thomas, Olan, CMB-11
Thorn, Patricia, MP-7
Thorne, Wayne, MP-2
Trexler, Mary Joe, H-DO
Velarde, Wilbur, ISD-7
Wagoner, George, GMX-3
Warren, John, P-2
White, Robert, GMX-7
White, Roy, C-3
Williamson, Kenneth, P-8
Wilson, Andy, GMX-3
Wingert, Anna, H-2
Witte, Kathleen, C-7
Wood, Daniel, SD-5
Woods, Richard, P-9
Yarema, Peter, J-3/NTS

LASL Scientists Will Study Local Wind Structure

Robert Fultyn, H-8, holds an orthogonal propeller anemometer while Dick Leep, E-4, assembles a quartz oscillator thermometer. On the tower's lowest instrument platform is Joe Herceg, H-8.

White Rock commuters who travel Pajarito Road have probably noticed the tall, steel tower that has been erected near Technical Area 50. The structure is a part of a new meteorological facility being readied for duty at the Los Alamos Scientific Laboratory for some long-term, sophisticated investigations of local winds.

The system will be used by the Laboratory's Environmental and Field Programs group, H-8, to determine how the atmosphere disperses and diffuses contaminates. According to Harry Jordan, H-8 group leader, and Robert Fultyn, this will be done through studies of wind structure and temperature with respect to height. The studies are scheduled to begin in July.

"We usually think of wind on a horizontal plane and most wind data is reported in only this manner," Jordan said. "But wind has a vertical component too, and the overall structure of the atmosphere varies with terrain, temperature and height. We've never studied atmospheric variations with height at Los Alamos, but when the tower instruments are in operation we expect on occasions to see the wind blowing one direction at one level and another direction at another level."

Wind characteristics and temperature will be measured at four levels ranging from near ground to the top of the 300-foot tower using instruments that are relatively new in the state-of-the-art of meteorology.

Characteristics of the wind will be measured with orthogonal propellor anemometers. An anemometer is an instrument used for measuring wind speed. Most of them resemble a windmill in principle, having either fan- or cup-like vanes which revolve around a vertical shaft. The speed with which they revolve is proportional to the velocity of the wind. Anemometers are usually used in conjunction with wind vanes which show the direction of the wind. The anemometers that will be used on the new facility will each have three propellers on

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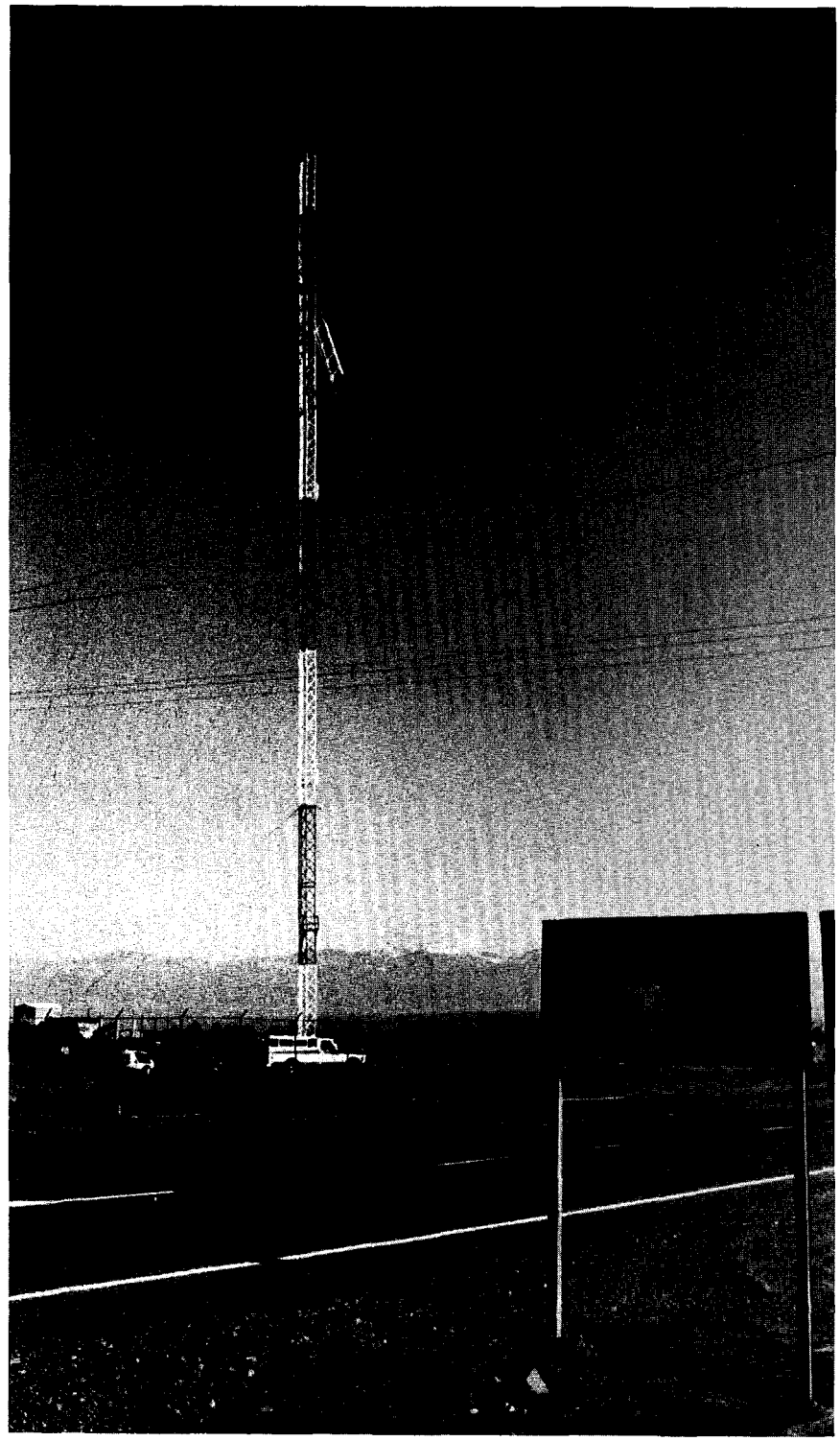
shafts at right angles (orthogonally) to one another. One of the propeller shafts will point south and another will point west since the prevailing winds in the Los Alamos area generally blow from the southwest. The third propeller shaft will point up to measure the vertical component of the wind.

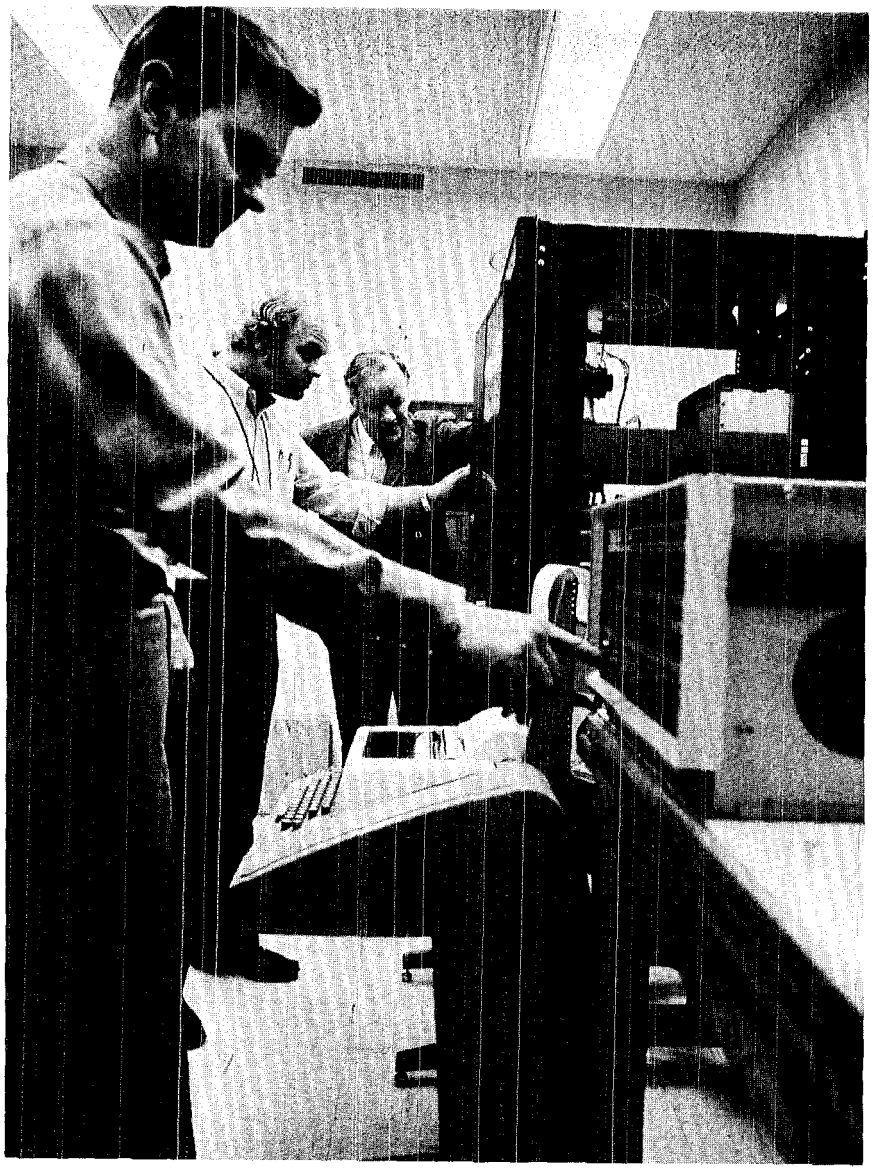
In addition to wind speed, the collective spin rates of each of an anemometer's three propellers will allow the precise determination of wind direction. For example, if the wind direction is angled somewhat downward and in a south-southwestern direction, the spin rates of the three propellers will not be the same. The propeller that points south will spin more rapidly than the one that points west, and the vertically oriented propeller will spin at a rate corresponding to the vertical angle of the wind. Winds from directions opposite those in which the anemometers are oriented will reverse the propeller spin directions. For example, if a southerly oriented propeller spins counterclockwise in a south wind, it will spin clockwise in a north wind. From the differences in propeller spin rates and directions, true wind direction can be accurately determined.

Because wind direction and velocity at each of the four levels on the tower will be observed electronically rather than visually, photodiodes (electric eyes) are built into the anemometers which transmit signals representative of the wind characteristics observed. Within each propeller shaft are two photodiodes, one of which is covered by a rotating disk or mask. Which one is covered is dependent on whether the spin direction of the propellers is clockwise or counterclockwise. The signal transmitted by one photodiode is different than that transmitted by the other and is indicative of whether the propellers are facing into or away from the wind.

Each propeller is mounted on a plastic disk in which three slots are cut equal distances apart. Every one-third revolution, one of these



A 20-foot tower section is winched to the top where three workmen are waiting to receive and bolt it in place.



Fultyn, Herceg and Harry Jordan, H-8 group leader, look over tower computer facilities at TA-50.

slots lines up with the photodiode not covered by the mask. The frequency of the signal transmitted by the photodiode is proportional to the velocity of the wind.

Temperature at various levels on the tower will be measured with quartz oscillator thermometers, ruggedly built instruments that respond rapidly and accurately to changes in temperature. The response of these thermometers is due to quartz crystals which oscillate and generate signals whose frequencies are dependent on temperature.

Signals from the anemometers and thermometers will be transmitted through an interface unit to a small computer at TA-50 which will translate them into meaningful meteorological data on magnetic tape. "We'll be collecting information at a rapid rate—on the order of one magnetic tape each day," Fultyn said. "This information will be put in a photo store (a compact film device used for storing large amounts of data for computer processing) by C-division where it can be retrieved for analysis much easier than with the strip-chart system used at present."

Data collected at the tower facility will eventually complement that collected by other meteorological instrumentation at the Laboratory. Meteorological information is used for such things as engineering design of LASL facilities, and for safety analysis and environmental reports submitted to the Atomic Energy Commission. Design of a structure is often influenced by wind- and snow-load conditions. Dispersal of gaseous effluents from Laboratory facilities is influenced by wind conditions and the stability of the atmosphere in canyons and on mesas.

There are also tentative plans to use the new tower facility in atmospheric diffusion studies. These would be conducted to determine the persistency of contaminates under a variety of atmospheric conditions. Instead of contaminates, however, H-8 personnel are considering the use of isotopes of the ICONS family. ICONS is the acronym for Isotopes of Carbon, Oxygen, Nitrogen and Sulfur. Since these are nonradioactive isotopes that exist in nature, they would have no detrimental impact on the environment. When isolated, small but concentrated amounts of them can easily be detected in any system whose makeup is governed by nature. The studies would be a logical extension of the Laboratory's activities since, with the exception of sulfur, LASL is one of the largest producers of the ICONS.

Engineering aspects of tower installation were determined by ENG-2. ENG-7 is responsible for interfacing electronics between the tower-mounted instruments and the computer, and anemometers and thermometers are being checked out and calibrated by Dick Leep, E-4.

Keith Boyer Named to Head New Laser Division at LASL

Keith Boyer

A new technical division has been formed to consolidate laser research and development activities which had previously been spread over many groups and divisions at the Laboratory. The new organization, the Laser Research and Technology (L) division, will carry on both basic and applied research in the field of short-pulse lasers.

Laboratory Director Harold Agnew has appointed Keith Boyer to head L-division. Robert Bussard is alternate division leader and Raymond Pollock is associate division leader.

Boyer has headed laser research activities at the Laboratory for more than a year under the Director's office. He has been assisted by Bussard since August. Bussard was a LASL staff member from 1955 to 1962. He was a partner of Cherokee Associates in Covina, Calif., prior to rejoining the Laboratory. Pollock was TD-2 group leader prior to joining the new division.

The division will initially be made up of 110 employees in five groups. The majority of its personnel were transferred from other groups at the Laboratory.

Charles Fenstermacher is L-1 group leader. He is assisted by Thomas Stratton, Wallace Leland and Robert Stapleton. This group carries on research and development of short-pulse gas discharge lasers of high pulse energy.

Group L-2, which will do research in neodymium glass laser systems, is led by Joseph Perry. Dennis Gill is alternate group leader.

Group L-3, the chemical laser research and development group, is headed by Reed Jensen with C. Paul Robinson as alternate group leader.

Gene McCall is group leader for L-4, the experiments and diagnostics group.

Systems and application studies will be carried on in Group L-5. A group leader has not yet been appointed. Associate group leader is William Lyons.

short subjects

Harry Otway, J-DO, has taken a two-year leave of absence to join the International Atomic Energy Agency in Vienna. He will be an advisor to the director of the Division of Health Safety and Waste Management on matters concerning radiological safety of nuclear installations and safety problems in peaceful uses of nuclear explosions.

Eleven men have been awarded certificates by the Shop department for successful completion of the Laboratory's machinist apprenticeship program.

The men, constituting the largest graduating apprentice class in LASL history, received their Certificates of Completion at a regular Shop department meeting. The ceremony preceded a meeting of the New Mexico Apprenticeship Council hosted by LASL the same day.

Receiving certificates were **Johnny E. Archuleta, Joseph B. Casados, Darrel K. Farmer, Raymond L. Garcia, Gomer J. Gray, Orvil D. Harkleroad, Cayetano Leyba, Raymundo A. Romero, Joe M. Sanchez, Manton D. Trimmer and Helario Valdez.**

John Hockett, W-7, has been appointed a member of the American Society of Metals Professional Development Committee.

Hockett will serve a three-year term on the committee. Its purpose is ". . . to take steps to assure an understanding of work and accomplishments in the field of metals and other engineering materials and of the people engaged therein."

Dorothy Richards, C-1, retired after working for the Laboratory since 1955. Mrs. Richard's husband, John, is employed by the Shop department.

Thomas Black, SD-1, retired after nearly 22 years with the Laboratory. Black and his wife, Daisy, will continue to live in Los Alamos.

Complete indexes for the 1971 issues of "The Atom" are available at ISD-1. There is no charge.

Arsenio Salazar, SP-8, a Laboratory employee since 1951, died in an Albuquerque hospital Jan. 14. He is survived by his wife, Maria, and five children: Michael, Cindy, Aaron, Elizabeth and Arsenio, Jr.

David Woods, former T-6 group leader, died recently in an Albuquerque hospital. He is survived by his daughter, Mrs. Amy (Charles) Gabriel, and two sons, Brian and H. Tadg. Woods was employed at the Laboratory from 1952 to 1970.

Bob Martin, ISD-7, has won the $100 Archival Award for his entries in the 1971 Photography Competition, sponsored by the Museum of New Mexico, Santa Fe.

Martin was presented the award ". . . for his consistant and outstanding recording of New Mexico buildings, many of which are already of historic interest."

A total of $300 in cash prizes were awarded in the competition. The contest was divided into two categories: Photographs of New Buildings—Post-1940, and Photographs of Old Buildings—Pre-1940.

A large number of entries in the competition will be selected for the Museum's photo archives. These and winning entries will be exhibited in the Palace of the Governors in conjunction with the Historic Preservation Exhibit in late December.

For Reporting Change of Address

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the technical side

Taken from LASL Technical Information Reports submitted through ISD-6

American Nuclear Society Meeting, Pittsburg, Pa. Oct. 26:

"Ball Lightning" by J. L. Tuck, P-DO (invited)

American Physical Society, Division of Plasma Physics Annual Meeting, Madison, Wis., Nov. 15-18:

"Electron Cyclotron Drift Instability in Turbulence" by D. W. Forslund, P-18 (invited)

International Atomic Energy Agency Symposium on Analytical Methods in the Nuclear Fuel Cycle, Vienna, Austria, Nov. 29-Dec. 3:

"The Measurement of the Oxygen to Heavy Metal Atom Ratio in Unirradiated Mixed-Oxide Fuels" by C. F. Metz, J. W. Dahlby and G. R. Waterbury, all CMB-1

"The Determination of Non-Metallic Specification Impurities in Mixed-Oxide Reactor Fuels" by C. F. Metz and G. R. Waterbury, both CMB-1

"A Statistically Designed Program for Sampling and Chemical Analysis of Reactor Fuel Materials" by R. K. Zeigler, C-5, G. M. Matlack, J. E. Rein and C. F. Metz, all CMB-1

"The Analysis of Nuclear Fuels—A Review" by C. F. Metz and G. R. Waterbury, both CMB-1

"Preparation and Characterization of Reference Material for the Chemical Specification Analysis of Uranium-Plutonium Mixed-Oxide Fuel and Source Material" by J. E. Rein, R. T. Phelps, W. H. Ashley, G. R. Waterbury and C. F. Metz, all CMB-1

"Sequential Ion Exchange Separation and Mass Spectrometric Determination of Neodymium, Uranium and Plutonium in Mixed-Oxide Fuels for Burnup and Isotopic Distribution Measurements" by R. M. Abernathey, G. M. Matlack and J. E. Rein, all CMB-1

"Status of Burnup Measurement Methodology" by J. E. Rein, CMB-1 (invited)

"Nondestructive Analytical Techniques for Materials in the Nuclear Fuel Cycle" by R. B. Walton, R. H. Augustson, L. V. East, A. E. Evans, J. E. Foley, R. A. Forster, G. R. Keepin, J. J. Malanify, H. O. Menlove, J. H. Menzel, J. L. Parker, T. D. Reilly, D. B. Smith, M. M. Thorpe and C. R. Weisbin, all A-1

American Chemical Society 27th Annual Southwest Regional Meeting, San Antonio, Texas, Dec. 1-3:

"Structural Similarities and Differences Among the Ammonium Fluoride Complexes of Tetravalent Cerium, Thorium, and Uranium" by R. A. Penneman and R. R. Ryan, both CNC-4

"Exploratory Shock-Wave Study of Hydrogen-Nitrogen Trifluoride and Hydrogen-Tetrafluorohydrazine—Butene Reactions" by G. L. Schott, L. S. Blair and J. D. Morgan, Jr., all GMX-7

"Interpreting Liquid Alloy Activity Measurements: A Changing Scientific Paradigm" by G. R. B. Elliott, D. R. Conant and C. E. Holley, all CNC-2, and B. L. Houseman, H. S. Swofford, Jr., and P. L. Robinson, all visiting staff members in CNC-2

"Reactive Scattering Studies Using Molecular Beams" by J. B. Cross, CNC-4 (invited)

"EPR (Electron Paramagnetic Resonance) Studies of Pentavalent Uranium Compounds" by W. B. Lewis and H. G. Hecht, both CNC-2, and M. P. Eastman, University of Texas, El Paso

"A Study of the Kinetics of the Reaction Between Hydrogen and Fluorine by ESR (Electron Spin Resonance) Methods" by S. W. Rabideau, H. G. Hecht, and W. B. Lewis, all CNC-2 (invited)

Joint Meeting, Division of High Energy Astrophysics, American Astronomical Society and Division of Cosmic Physics, American Physical Society, San Juan, Puerto Rico, Dec. 1-4:

"Fluctuations of Cygnus X-1" by N. J. Terrell, Jr., P-DOR

Seminar, Arizona State University, Tempe, Dec. 3:

"Thermodynamic Properties of the Transition Metal Carbides" by E. K. Storms, CMB-3

Annual Fall Meeting, American Geophysical Union, San Francisco, Calif., Dec. 6-9:

"Explorer 43 Plasma Characteristics in the Vicinity of the Subsolar Bow Shock" by S. J. Bame, J. R. Asbridge, W. C. Feldman and M. D. Montgomery, all P-4 (invited)

"Coordinated Observations of the Development of a Substorm" by S. B. Mende, R. D. Sharp and E. G. Shelley, all Lockheed Palo Alto Research Laboratory, Calif., G. Haerendel, Max-Planck Institute for Space Physics, Garching, Germany, and E. W. Hones, Jr., P-4

"The Effect of a Time-Dependent Substorm Electric Field Model on Plasma Sheet Particles" by J. G. Roederer, University of Denver, Colo., and E. W. Hones, Jr., P-4

"A Preliminary Measurement of Extreme Ultraviolet in the Aurora" by J. K. Theobald, J-10

"Anisotropic Fluxes of Protons at r Approximately 18 Earth Radii in the Magnetotail Plasma Sheet" by J. R. Asbridge, E. W. Hones, Jr., M. D. Montgomery and S. J. Bame, all P-4, and S. I. Akasofu, Geophysical Institute, University of Alaska, Fairbanks

"Substorm Variations of the Plasma Sheet Near the Midnight Sector of the Neutral Sheet" by E. W. Hones, Jr., S. J. Bame and S. Singer, all P-4, and S. I. Akasofu, Geophysical Institute, University of Alaska, Fairbanks

"Two Successful Field Tracing Experiments with Shaped-Charge Injected Barium Plasma" by H. M. Peek, J. W. Kodis, D. M. Kerr, Jr., R. J. Jensen and R. A. Jeffries, all

J-10, and E. M. Wescott, H. C. S. Nielsen, W. B. Murcray and T. N. Davis, all Geophysical Institute, University of Alaska, Fairbanks.

"Energy and Mass Content of Large Scale High Speed Streams in the Solar Wind" by M. D. Montgomery and S. J. Bame, both P-4, and A. J. Hundhausen, High Altitude Observatory, Boulder, Colo.

"The Magnetotail Plasma Sheet" by E. W. Hones, Jr., P-4 (invited)

"Simultaneous Solar Wind-Magnetosheath Plasma Measurements by a Pair of Satellites" by H. E. Gilbert and S. J. Bame, both P-4, and K. W. Ogilvie, NASA Goddard Space Flight Center, Greenbelt, Md.

Seminar, Nuclear Engineering Department, University of Texas, Austin, Dec. 7:

"Controlled Fusion" by D. A. Baker, P-18

Underground Nuclear Test Measurements Symposium, Sandia Laboratories, Albuquerque, Dec. 7-9:

"Low Temperature Equation of State for Metals" by A. L. Merts and N. H. Magee, both T-4

"Two-Dimensional Impulse Calculations" by R. J. Hanold and W. Matuska, both J-15

"One-Dimensional Impulse Calculations" by A. N. Cox, J. A. Whitfill, and D. D. Eilers, all J-15

"Some Results from a Delta Plutonium Equation of State Experiment on the Pedernal Event" by R. H. Warnes and R. D. Dick, both GMX-4, and B. C. Diven, P-3

"Time Domain Reflectometry for Strain and Manganin Gauge Sensing" by R. R. Fullwood, W-8

"Wide-Band Magnetic-Disk Recording of Analog Field data and Digital Readout to a Remote Terminal" by R. R. Fullwood and L. R. Veeser, both W-8

"On the Use of Fission Fragments as a Blowoff Velocity Density Probe" by R. R. Fullwood, W-8, and A. A. Robba, A-2

"Displacement Transducer Gauges for Impulse Measurement" by V. A. Starkovich, W-10, and F. T. Seibel, W-8

"Scaling Laws for Blowoff Impulse" by R. S. Dingus and R. P. Godwin, both W-10

Symposium on Air Pollution, Turbulence and Diffusion, Las Cruces, N.M., Dec. 7-10:

"The Numerical Calculation of Three-Dimensional Flows of Air and Particulates About Structures" by R. S. Hotchkiss, T-3

"Identification of Aerosols in the Southwestern United States Using Activation Analysis and Scanning Electron Microscopy" by W. A. Sedlaceck, P. R. Guthals and Helen L. Smith, all CNC-11

Space Nuclear System Office Fuel and Insulator Materials Review, Westinghouse Astronuclear Laboratory, Large, Pa., Dec. 8-9:

"Composite Element Properties as a Function of Fabrication Variables" by R. J. Bard, CMB-8

Albuquerque Section, American Society for Nondestructive Testing, Albuquerque, N.M., Dec. 9:

"Some Newer Methods and Some Unsolved Problem Areas for Nondestructive Testing" by D. E. Elliott, GMX-1

Space Nuclear Systems Office Fuel and Insulator Materials Review, Westinghouse Astronuclear Laboratory, Large, Pa., Dec. 8-9:

"Review of Los Alamos Scientific Laboratory Insulator Development Program" by J. M. Taub, CMB-6

"Effect of Raw Materials and Processing on the Properties of Extruded Carbide-Graphite Composite Fuel Elements" by K. V. Davidson, CMB-6

"Factors Influencing the Rate of ZrC Deposition—Application to Composite Elements" by T. C. Wallace, CMB-3

Seminar, Desert Research Institute, Nevada Southern University, Las Vegas, Dec. 15:

"Biological Studies Related to Radiation Exposure Standards" by C. R. Richmond, H-4 (invited)

1971 Conference on Decision and Control, Miami Beach, Fla., Dec. 16-18:

"Deconvolution of Linear Systems by Constrained Regression and Its Relationship to the Wiener Theory" by B. R. Hunt, C-5

American Association for the Advancement of Science Symposium on Energy Production from Nuclear Fusion, Philadelphia, Pa., Dec. 27:

"Nuclear Fusion—Pulsed-Magnetic-Confinement and Laser-Fusion Research" by F. L. Ribe, P-15

Lion's Club, Espanola, Jan. 13:

"Medical Radioisotopes and Biomedical Program at LAMPF" by H. A. O'Brien, Jr., CNC-11 (invited)

Canadian Atomic Energy Commission-Biophysical Society Meeting, Winnipeg, Manitoba, Canada, Jan. 13-14:

"High-Speed Cell Analysis Research at the Los Alamos Scientific Laboratory" by P. F. Mullaney, H-4 (invited)

American Chemical Society, Mohave Desert Section, China Lake, Calif., Jan. 17, and Boulder Dam Section, Las Vegas, Nev., Jan. 18:

"Chemistry in Explosions" by W. C. Davis, GMX-8

Winter 1972 Meeting, American Mathematical Society, Las Vegas, Nev., Jan. 19:

"Numerical Quadrature by the E-Algorithm" by D. K. Kahaner, C-6

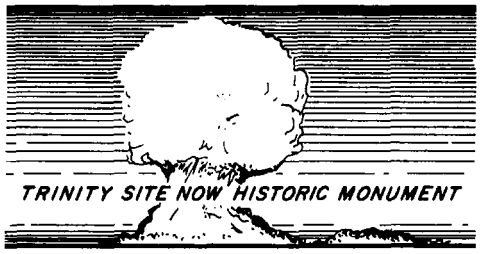
Seminar, Department of Biochemistry, University of New Mexico School of Medicine, Albuquerque, Jan. 20:

"Structural Alterations of Histones" by G. R. Shepherd, H-4 (invited)

Marathon Oil Company, Littleton, Colo., Jan. 28:

"Science and Society—A Complex Interaction" by L. Rosen, MP-DO

20 years ago in los alamos



Culled from the March, 1952, files of the Santa Fe New Mexican by Robert Porton

Commissioner Murray Visits

AEC Commissioner Thomas Murray of New York said during a visit here that present plans call for the use of proving grounds at Frenchman's Flat in Nevada and Eniwetok Island in the Pacific for future A-Bomb tests. Murray is presently on a tour of AEC installations. He stated he is "very pleased" with the progress he has seen.

Hill Women Form Golf Group

The golf widow or non-playing wife of a golfer, will soon be as extinct as the dodo bird in Los Alamos. A new organization for women whose husbands play golf has been established on the Hill, named the Los Alamos Women Golfers Association. It has as its prime function the encouragement, fostering and promotion of the distaff side of the game.

Governor Urges Trinity Site Preservation

Governor Edwin Mechem has asked the Departments of Defense and Interior to meet with the AEC to discuss the preservation of Trinity Site near Alamogordo as a permanent monument. Work was about to begin to destroy the area when the Governor intervened. The world's first atomic bomb—developed after months of research at Los Alamos and other laboratories—was exploded on the desert spot on July 16, 1945.

AEC Versus Caballos

The Atomic Energy Commission ran into some opposition from nature and it was a draw. An AEC truck with an undisclosed cargo slammed into a group of five horses a mile south of the Otowi Bridge on the Los Alamos—Santa Fe highway. One animal was knocked down but got up, looked at the truck and walked away. The others evidently escaped injury entirely. The truck suffered considerable damage.

what's doing

PUBLIC SWIMMING: High School Pool—Monday through Wednesday, 7:30 to 9 p.m.; Saturday and Sunday, 2 to 5 p.m.; Adult Swim Club, Sunday, 7 to 9 p.m.

SIERRA CLUB: Luncheon meeting at noon, first Tuesday of each month, South Mesa Cafeteria. For information call Brant Calkin, 455-2468, Santa Fe.

RIO GRANDE RIVER RUNNERS: Meetings scheduled for noon, second Friday of each month at South Mesa Cafeteria. For information call Joan Chellis, 662-3836.

LOS ALAMOS SAILORS: Meetings at noon, South Mesa Cafeteria, first Friday of each month. For information call Dick Young, 662-3751.

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leaders for information.

March 12—Lake Peak, Ken Ewing, 662-7488.

March 25-April 2—Kino Bay, Gulf of California, Mexico, Cecil Carnes, 672-3593.

Gila River (when conditions permit), river trip, Walter Green, 672-3203.

MOUNTAIN MIXERS SQUARE DANCE CLUB: Mesa School, 8 p.m. For information call Florence Denbow, 662-5014.

March 4—Bones Craig, club caller
March 18—Bill Wright, Farmington
April 1—Gregg Anderson, Colorado Springs, Colo.

LOS ALAMOS CONCERT ASSOCIATION: March 15, 8:15 p.m., Civic Auditorium, Houston Ballet. For information call Marilyn Stevens, 662-4873.

SPORTS CAR CLUB DEL VALLE RIO GRANDE: Meetings 7:30 p.m., Hospitality Room, Los Alamos National Bank, first Tuesday of each month. For information call Gerry Strickfaden, 672-3664 or Frank Clinard, 662-4951.

MESA PUBLIC LIBRARY:

Exhibits

Feb. 23-March 14—Pottery from El Mirador Home for Retarded Boys
March 6-20—Los Alamos Garden Club exhibit on environment
March 6-26—Paintings, watercolors and acrylics, Gary Hamberg
March 15-29—National Park Service exhibit
March 21-April 11—Conchita Quintana, Santa Fe, tincraft

Slide Program
(Adults and Young Adults only) 7:30 p.m.

March 7—British Honduras, Kay Harper
March 21—New Mexico countryside, Eleanor Daggett

NEWCOMERS CLUB: March 22, 7:30 p.m., Los Alamos National Bank Hospitality room: "Parent Effectiveness." For information call Pat Astle, 662-4709.

Professor Robert Serber, at center facing camera, who played a vital role in the original mission of the Los Alamos Scientific Laboratory, talks with old friends at Fuller Lodge following a luncheon hosted by Beverly (Mrs. Harold) Agnew, second from left. Others shown are Nick Metropolis, C-DO advisor; Carson Mark, acting T-division leader; Charles Critchfield, T-9 group leader; Richard Taschek, assistant director for research; and John Manley, research advisor. Serber was a senior scientist and group leader in T-division during the war years and was a special consultant on the first atomic bomb mission against Japan.

Henry T. Motz
3187 Woodland
Los Alamos, New Mexico 87544

Laboratory officials met with representatives of the Navajo Tribal Council to discuss possible ways in which the Laboratory's technical capabilities might be helpful in the development of long term plans for the economic growth of the Navajo reservation. Austin McGuire of the Laboratory's Office of Special Projects, right, used transparencies to show some of LASL's capabilities in certain areas of possible interest to the Indian representatives. Among Laboratory personnel attending the meeting were Mel Bowman, CMB-DO, left, and Fred Young, second from right. Members of the Navajo delegation are Jim Shory, staff assistant to the chairman of the Navajo tribe; Arthur Hubbard, Jr., superintendent of water works; and Thomas Atdity, vice president of the Navajo Community College.